

CLASS 162, PAPER MAKING AND FIBER LIBERATION

SECTION I - CLASS DEFINITION

This class includes:

A. Processes for the liberation, recovery or purification of fibers as individual staple fibers or as a pulp of such fibers, including cellulosic fibers, from a fibrous containing material by use of a reagent which exerts some chemical or solvent action upon the fibrous material.

B. Reagent compositions employed in the processes "A" above, and processes of preparation of such compositions, not otherwise provided for;

C. Processes including the deposition of fibers from a liquid suspension thereof in order to form an interfelted product and processes of treatment of the deposited fibrous product prior to the final drying thereof;

D. Fibrous pulps and deposited fibrous webs or articles which are produced by processes "A" or "C" above, which are not otherwise provided for;

E. In addition to the products set forth in "D," this class also includes any nonstructural fiber or fiber containing product (e.g., particular fiber blend) manufactured by any other process (e.g., airlaid) where not elsewhere provided for. See Subclass References to the Current Class, below, and also see References to Other Classes, below, for classes that refer to this section.

F. Apparatus employed in carrying out processes "A" and "C" above, not otherwise provided for;

G. An endless Fourdrinier wire is provided for in this class.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. FIBER PREPARATION OR TREATING PROCESSES

Within this class processes of fiber preparation are classified in subclass 1. This portion of the class is concerned with the treating of fiber and fibrous materials with chemicals for the purpose of making a pulp or suspension of individual staple fibers which may be deposited from a liquid suspension thereof, thus forming an

interfelted fibrous product (paper) or the fibers may be employed for textile purposes.

This class provides for the chemical liberation of these fibers as well as the purification or refining, bleaching, etc., of the fibers with a reagent which exerts some chemical action.

LINE WITH CLASS 8 AND CLASS 19

This class is related to Class 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, and Class 19, Textiles: Fiber Preparation, which also provide for fiber treating processes. Class 8 provides for processes of fluid treatment and chemical modification of textiles and fibers not elsewhere provided for. With respect to pulps and suspension of individual fibers the line with Class 8 is as follows:

Class 162 takes (1) processes involving liberating, purifying, bleaching or refining such fibers, (2) processes in which the fibers are modified by hydration, mercerizing or parchmentizing; Class 8 takes all processes of chemically modifying such fibers other than by hydration, mercerization or parchmentizing. Class 162 (in subclass 100 particularly subclass 162) also takes dyeing of such fibers.

Class 8 provides for purifying, bleaching, etc., of fabrics, strands, yarns, filaments, etc., as distinguished from fibrous pulps. Patents to processes in which both a fibrous pulp and a fabric, strand, yarn, etc., is claimed (or disclosed if claimed only generically) are classified in Class 8. Combinations of a step of purifying or liberating the fiber with a step of modifying it, per se, belonging in Class 8, are classified in Class 162.

Class 8, particularly in subclasses 137+ and 147+, provides for the cleaning and laundering of textile fabrics and fibers, that is, for the removal of materials not originally associated with a natural fiber and the removal of any material from synthetic fibers. The treatment may be effected with or without chemical action. Thus, manipulative processes of washing pulp or fibers in bulk form are classified in Class 8, subclass 156.

Class 19 provides for the mechanical treatment of fibers to put them in condition for use.

See References to Other Classes, below, for related fiber preparation or treating processes classes.

B. FIBER TREATING AGENTS

Chemical reagent compositions used for liberating fiber from a fiber containing material (e.g., wood) are included and are classified with the corresponding process. This class provides also for processes of making or regenerating such agents. Also see Subclass References to the Current Class and References to Other Classes, below.

C. FIBROUS PRODUCT MAKING AND TREATING

This class includes processes of forming an interfelted fibrous product by deposition from liquid suspension including the addition of other material to the fibrous suspension whether the deposition step is included or not. This class also includes processes for treating the deposited web or article prior to final drying thereof. The fibrous character of the product must be retained in the final product. Also see Subclass References to the Current Class and References to Other Classes, below.

D. COMBINATIONS WITH OTHER PAPER TREATING OPERATIONS

This class generally includes combinations of a fiber liberation or purification step with other fiber treating steps or of a deposition from a liquid suspension with other treatment of the interfelted product (in which the fibrous nature of the product is retained). Processes of fiber liberation or purification combined with processes of employing the liberated fibers for the manufacture of a product (other than by deposition from a fiber suspension) are, in general, classified in the class providing for the particular manufacturing operation involved. See References to Other Classes, below.

E. PRODUCTS

This provides for paper products resulting from processes classified herein. However, articles and materials having structure or other characteristics provided for in other classes are classified therein, even though made of paper, or disclosed or claimed as having been made by a process classifiable herein. Also see References to Other Classes, below.

F. APPARATUS

This class includes apparatus employed for carrying out processes classifiable herein not otherwise provided for. Also see Subclass References to the Current Class and References to Other Classes, below.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 29+, for processes of making or regenerating agents.
- 70+, for chemical reagent compositions used for liberating fiber from a fiber containing material (e.g., wood).
- 100+, for processes of forming an interfelted fibrous product by deposition from liquid suspension including the addition of other material to the fibrous suspension whether the deposition step is included or not.
- 141, through 181 for any nonstructural fiber or fiber containing product (e.g., particular fiber blend) manufactured by any other process (e.g., air-laid) where not elsewhere provided for.
- 160, and 161 for paper impregnated for purposes of preserving the paper.
- 232+, for apparatus employed for carrying out processes classifiable herein not otherwise provided for.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 400 through 696 for dyed paper, produced by the action of a dye upon dry paper, subclasses 115.51+ for chemically modified fibers, per se. (See Lines With Other Classes and Within This Class, "Products", above.)
- 19, Textiles: Fiber Preparation, appropriate subclasses for air felting. (See Lines With Other Classes and Within This Class, "Fibrous Product Making and Treating", above.)
- 19, Textiles: Fiber Preparation, appropriate subclasses for air felting, per se, of fibers. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 28, Textiles: Manufacturing, appropriate subclasses, appropriate subclass for textile products having significant textile characteristics or features not provided for in other textile classes. (See Lines With Other Classes and Within This Class, "Products", above.)
- 29, Metal Working, subclasses 90.1+ for burnishing waterlaid products. (see Lines With Other Classes and Within This Class, "Fibrous Product Making and Treating", above.)

- 29, Metal Working, subclasses 90.1+ for burnishing apparatus employed for treating fibrous layers or paper. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 34, Drying and Gas or Vapor Contacted With Solids, appropriate subclasses, for processes of drying a wet web or article of deposited fibers. (see Lines With Other Classes and Within This Class, Fibrous Product Making and Treating, above.)
- 34, Drying and Gas or Vapor Contact With Solids, appropriate subclass for drying a freshly deposited fibrous layer. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 65, Glass Manufacturing, subclasses 376+ for a process of making glass fibers or mineral wool. (see Lines With Other Classes and Within This Class, Fibrous Product Making and Treating, above.)
- 65, Glass Manufacturing, subclasses 376+ for glass fibers or mineral wool forming. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 100, Presses, appropriate subclasses for presses, per se, even though employed for treating paper or fibrous webs or articles. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 100, Presses, appropriate subclasses, for mere pressing to express moisture from a web or article deposited, and for pressing or calendering dry paper. (see Fibrous Product Making and Treating)
- 106, Compositions: Coating or Plastic, appropriate subclass for nonwaterlaid plastic and coating compositions comprising fibrous and inorganic materials, as well as fibrous material associated with an organic material, other than a synthetic resin. (See Lines With Other Classes and Within This Class, Products, above.)
- 131, Tobacco, subclass 365 for tobacco-containing paper, intended to be burned in smoking. (See Lines With Other Classes and Within This Class, Products, above.)
- 138, Pipes and Tubular Conduits, appropriate subclasses for tube structure. (See Lines With Other Classes and Within This Class, Products, above.)
- 137, Fluid Handling, subclass 4 for processes of regulating or maintaining the consistency of a fiber suspension by control of liquid flow. (see Fibrous Product Making and Treating, above.)
- 137, Fluid Handling, particularly subclass 92 and 467.5 for apparatus employed in the regulation or maintenance of the consistency of a fibrous suspension which may be disclosed as useful in making paper. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 62.2+ for deposition of particulate material by other than water laying to form a self sustaining web or batt, combined with a laminating step, and subclasses 369+ for apparatus for forming self-sustaining webs from particulate material. See the search note to Class 264 below, for processes of forming self sustaining webs from bulk deposited particles, per se. (see Lines With Other Classes and Within This Class, "Fibrous Product Making and Treating," above.)
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 52 through 56, for impregnated paper used for electrolytic printing (see the Class 162 definition, Lines With Other Classes and Within This Class, Products section) and subclasses 689-694 for electrolytic treatment of organic fibrous material (see the Class 162 definition, Lines With Other Classes and Within This Class, Fiber Preparation or Treating Processes section).
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, particularly subclasses 727+, for separating solids from fibers by a solids separation procedure there provided for. (See Lines With Other Classes and Within This Class, Fiber Preparation Or Treating Processes, above.)
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses particularly subclasses 727+ for apparatus used in separating nonfibrous solids (e.g., sand) from fibers. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 210, Liquid Purification or Separation, appropriate subclasses, for apparatus for separating liquid from a fibrous suspension. Such separators which are designed for the laying down of a felted fibrous product, as the Fourdrinier type machine, are classified in Class 162 even though there is a separation of the liquid, usually water, from a fibrous suspension. (See Lines With Other Classes and Within This Class, "Apparatus," above.)

- 210, Liquid Purification or Separation, appropriate subclasses for the separation of liquid from fibers other than those resulting in the formation of a felted fibrous product. (See Lines With Other Classes and Within This Class, Fiber Preparation Or Treating Processes, above.)
- 229, Envelopes, Wrappers, and paper Board Boxes, for articles of that type. (See Lines With Other Classes and Within This Class, Products, above.)
- 241, Solid Material Comminution or Disintegration, appropriate subclasses for grinders, heaters, comminutors, etc., employed for treating fibrous material for reducing it to individual fibers. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 241, Solid Material Comminution or Disintegration, particularly subclass 4 for the grinding, comminuting or heating of fibrous material, uncombined with any chemical treatment, in order to separate the material into smaller individual fibers. (See Lines With Other Classes and Within This Class, Fiber Preparation Or Treating Processes, above.)
- 252, Compositions, subclass 567 for a paper web or sheet impregnated with a defined liquid dielectric. (See Lines With Other Classes and Within This Class, Products, above.)
- 252, Compositions, subclasses 186.1+ and 188.1+ for bleaching agent compositions even though disclosed as being useful for bleaching pulp. (See Lines With Other Classes and Within This Class, Fiber Treating Agents, above.)
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes within the class definition, for shaping or molding of plastic materials including that of a dried, preformed blank of paper pulp, with or without remoistening thereof. Class 264 also generally takes processes for forming articles by uniting of discrete bulk assembled particles, and also forming articles by depositing particles other than fibers from a slurry (e.g., mica, clay, etc.). (see Lines With Other Classes and Within This Class, Fibrous Product Making and Treating, above.)
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes within the class definition, for molding or shaping plastic materials which may include the step of destroying the fibrous or felted nature of a deposited web or article. See subclass 80 for flame contact or heat decomposition of work, broadly, and subclasses 109+ for forming articles by uniting of discrete bulk assembled particles, not containing free metal particles, per se. (see Combinations With Other Paper Treating Operations, above.)
- 383, Flexible Bags, for bags. (See Lines With Other Classes and Within This Class, Products, above.)
- 419, Powder Metallurgy Processes, subclasses 61+ for processes for forming articles by uniting randomly associated metal particles without heating. (see Lines With Other Classes and Within This Class, Combinations With Other Paper Treating Operations, above.)
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 285 and 307+ for cookers and digesters other than those used for liberating or treating fibers. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 423, Chemistry of Inorganic Compounds, appropriate subclasses, for process of preparing or reclaiming inorganic compounds by a chemical reaction. See especially subclasses 511+ for sulfur containing compounds; for the line between the classes see line note to Class 162 in definition of Class 423, Search Notes. (See Lines With Other Classes and Within This Class, Fiber Treating Agents, above.)
- 424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 14+ and especially subclasses 16+ for a composition of that class including a structural feature which may included a coating or impregnation of a paper base. (See Lines With Other Classes and Within This Class, Products, above.)
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 80.1+ for means forming self-sustaining bodies of particulate material including an air felting type shaping means, and subclasses 84+ for a shaping surface and means for removal of liquid vehicle or component as a liquid. (See Lines With Other Classes and Within This Class, "Apparatus," above.)
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses for paper impregnated with a food treating agent. This class (162) provides for paper impreg-

- nated for purposes of preserving the paper. (See Subclass References to the Current Class, above.)
- 427, Coating Processes, appropriate subclasses for processes of coating paper not combined with a paper making step, or where the paper is not still wet from the paper forming operation. (See Lines With Other Classes and Within This Class, Products, above.)
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a nonwaterlaid fiber or fiber containing product as set forth in "E" in the class definition of this Class 162 where said product processes either internal structure (e.g., crimped fiber, etc.) or external structure (e.g., nonplanar component, etc.). (See Class Definition, E, above.)
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 496+ for paper coated with a radiation sensitive composition. (See Lines With Other Classes and Within This Class, Products, above.)
- 435, Chemistry: Molecular Biology and Microbiology, subclass 277 and 278 for fiber treating processes involving fermentation. (See Fiber Preparation Or Treating Processes, above.)
- 435, Chemistry: Molecular Biology and Microbiology, subclass 277 for combination of fermentative and chemical digestion. (see Lines With Other Classes and Within This Class, Combinations With Other Paper Treating Operations, above.)
- 520, Synthetic Resins or Natural Rubbers, for non-waterlaid synthetic resin or natural rubbers containing compositions.
- 536, Organic Compounds, subclasses 30+ and 56+ for cellulose liberation or purification followed by conversion of the cellulose to a cellulose derivative which is not followed by deposition of fibers from liquid suspension or other step provided for in Class 162. (See Lines With Other Classes and Within This Class, Combinations With Other Paper Treating Operations, above.)
- 588, Hazardous or Toxic Waste Destruction or Containment, subclass 254 for containment of asbestos and subclass 255 for containment with polymers. (See Lines With Other Classes and Within This Class, Fiber Preparation Or Treating Processes, above.)

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This subclass is indented under the class definition. Processes for the liberation, recovery or purification of cellulose or of fibers as individual fibers or fibrous pulp occurring in a fibrous material by the use of a reagent which exerts some solvent or chemical action upon the fibrous material and the reagent compositions employed in such processes.

- (1) Note. Processes classifiable in this or indented subclasses include those involving the use of a material which exerts some solvent action or reacts with some constituent of the fibrous material, without destroying the fibrous characteristics of the material. Included are treatments with steam and water heated above atmospheric temperature. Processes involving hydration, mercerizing or parchmentizing of the resultant liberated fiber or of an undried web of fibers freshly deposited from liquid suspension are also included, however other treatments of chemically modifying of fibers are classified in Class 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, particularly subclasses 115.5+.
- (2) Note. Chemical reagent compositions employed in processes of liberating (digesting) fibers are classified with the corresponding process of liberating, note particularly subclasses 70+. Processes involving recovering or regenerating such compositions in condition for reuse in digestion (liberation) are classified in subclasses 29+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 29+, for processes including the recovery, reuse or recycling of the digestion agent or liquor (see (2) Note).
- 70+, for processes of liberating cellulosic fiber employing a particular digesting composition and for the compositions employed (see (2) Note).
- 100+, for liberated fiber compositions and fiber pulps resulting from processes classifiable herein (subclasses 1+) not otherwise provided for.

SUBCLASSES

232+, for apparatus employed in processes of digestion of fibrous material classified herein (subclasses 1+).

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, appropriate subclass for chemical modification and fluid treatment of fibers and textiles, not otherwise provided for. Processes of bleaching and purifying individual fibers or fiber pulp, as distinguished from filaments, yarns, textiles, etc., is classifiable in this class (162). Similarly, hydration, mercerization or parchmentizing such fibers or undried web thereof are also in this class (162). Other chemical modification or fluid treatment of textiles and fibers, (e.g., dyeing) are found in Class 8. Bleaching or purifying processes which, as claimed, may be applied either to a fiber or fibrous pulp as well as to a filament yarn or textile are classified in Class 8.

19, Textiles: Fiber Preparation, appropriate subclasses, for the purification, recovery or liberation of fibers by mechanical action only.

106, Compositions: Coating or Plastic, subclass 123.1 for coating or plastic compositions having as one ingredient thereof a cellulose liberation liquor.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 689 through 694 for electrolytic treatment of organic fibrous material.

241, Solid Material Comminution or Disintegration, subclass 28 and other appropriate subclasses, for processes of fiber liberation involving mechanical comminution only, or such comminution in the presence of water at ambient or lower temperatures. The combination of mechanical comminution and chemical treatment or treatment of fibrous material with water at higher than ambient temperature, is classified in Class 162. See especially subclasses 20 through 28.

252, Compositions, subclasses 186.1+, 187.1 and 188.1+ for mere bleaching agents, even though they may be used for bleaching fibers as provided for herein (in Class 162).

423, Chemistry of Inorganic Compounds, appropriate subclasses, for the recovery of chemical elements or inorganic compounds, per se, and for the line between the classes, see line note to Class 162 in the definition of class 423, Search Notes.

435, Chemistry: Molecular Biology and Microbiology, subclass 277 and 278 for processes of liberating, recovering and/or purifying of fibers, involving fermentation.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

536, Organic Compounds, particularly subclass 30 and 56 for processes of modifying cellulose in which its fibrous nature is destroyed, e.g., in the production of cellulose esters.

2 This subclass is indented under subclass 1. Processes which include the liberation, recovery and/or purification of animal fibers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

143+, and 151, for processes of depositing fibrous products from waterlaying a liquid suspension which include animal fibers, and the products of such processes.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 94.1+ for fluid or chemical treatment of hides, skins, feathers and animal tissues, not otherwise provided for, subclass 127.5 for processes of chemically modifying proteinaceous fibers, and subclass 138 for processes for fluid or chemical treatment of silk for the removal of servicing, or other naturally occurring gum or wax. Processes classifiable in this subclass (2) generally include the production of a fiber pulp from a raw proteinaceous fibrous material, (e.g., leather).

260, Chemistry of Carbon Compounds, subclasses 112+ for proteins and reaction products thereof.

435, Chemistry: Molecular Biology and Microbiology, subclass 251 and 252 for processes of liberation or purification of silk, keratins or protein involving fermentation.

3 This subclass is indented under subclass 1. Processes which include the purification, recovery and/or liberation of mineral fibers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

145, and 152+, for processes of waterlaying products depositing fibrous products from a liquid suspension which includes mineral fibers, and the resulting products.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclasses 376+ for a process of making glass fibers or mineral wool.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 62.2+ for laminating processes in which at least one lamina, e.g., a batt, is formed by bulk deposition of discrete particles.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 109+ for processes under the class definition for forming articles by uniting randomly associated particles, not containing free metal particles, particularly subclass 110 providing for mica particles.

423, Chemistry of Inorganic Compounds, subclasses 326+ for the chemical preparation of silicates not combined with a fiber liberation step; see also line note to Class 162 in definition of Class 423, Lines With Other Classes and Within This Class.

4 This subclass is indented under subclass 1. Processes which include the treatment of paper or textile waste such as old newspapers, waste rags, etc.

(1) Note. Many of the processes classifiable herein are drawn to the "deinking" of news print. Many processes also include a mechanical defibration. In this subclass the chemical or solvent agent may act upon the ink, or other material associated with the waste paper or textile.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

191, for processes including the recovery or reuse of the "broke" or "trim", which is the waste material from a previous waterlaying step, for the production of pulp for further waterlaying, which process does not involve any repulping with a chemical or solvent agent.

SEE OR SEARCH CLASS:

134, Cleaning and Liquid Contact With Solids, for processes of chemically removing coatings, such as wax, from a paper base without otherwise affecting the base, where the coating is not recovered.

- 208, Mineral Oils: Processes and Products, subclasses 24+, for processes of recovering wax from waxed paper which does not include the recovery of fiber or fibrous pulp.
- 5** This subclass is indented under subclass 4. Processes in which an organic agent is employed.
- (1) Note. In many cases the organic agent is a solvent for the ink in a deinking process.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
72+, for the digestion or treatment of nonwaste or unused cellulose in which an organic agent is employed.
- 6** This subclass is indented under subclass 4. Processes in which elemental chlorine, a chlorine compound, oxygen, ozone or a percompound is employed.
- (1) Note. Example of percompounds are hydrogen peroxide, sodium perborate and potassium permanganate.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
73, 74 and 87+, for processes of digesting or treating nonwaste or unused cellulose in which chlorine or a chlorine compound is employed.
78, for processes of digesting a treating nonwaste or unused cellulose in which a percompound is employed.
- 7** This subclass is indented under subclass 4. Processes in which elemental sulfur or a sulfur compound is employed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
82, for processes of digesting or treating nonwaste or unused cellulose with sulfur or a sulfur-containing material.
- 8** This subclass is indented under subclass 4. Processes in which an alkali metal, an alkaline earth metal or ammonium compound is employed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
90, for processes of digesting or treating nonwaste or unused cellulose in which an alkali metal, alkaline earth metal or ammonium hydroxide or carbonate is employed.
- 9** This subclass is indented under subclass 1. Processes combined with a chemical or physical modification of the liberated fiber.
- (1) Note. Examples of chemical or physical modifications included a formation of a cellulose derivative, change of shape of the fiber as curling, twisting, untwisting, puffing, swelling (with agent other than water), etc.
- (2) Note. Excluded from this subclass are (1) dyeing, (2) removal of a constituent of the fiber unless accompanied by some physical deformation of the fiber such as curling, puffing, etc., and (3) hydration, mercerizing or parchmentizing of the fiber, even though combined with a digestion or purification of the fibrous material.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
79, for processes of parchmentizing cellulose fibers by use of zinc chloride.
82, for processes of parchmentizing cellulose fibers by use of sulfuric acid.
90, for processes of mercerizing cellulose fibers.
146, and 157.1+, for processes of making paper products (depositing from liquid suspension) in which chemically modified fibers are employed.
- 10** This subclass is indented under subclass 1. Processes combined with the addition or retention of a nonfibrous ingredient to or in the feltable fibrous product.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
158+, for processes involving adding or retaining one or more nonfibrous ingredients to or in the fibrous product

not combined with the digestion, liberation or purification of the fibers.

- 11** This subclass is indented under subclass 10. Processes in which the nonfibrous ingredient is derived in whole or in part from the plant or portion thereof from which the fiber is liberated.

(1) Note. The nonfiber material may be extracted from the raw fiber-containing material and later added to the same batch of material from which it was derived, or to a different batch. The nonfiber material may also be the reaction product of an original constituent of the plant, such as a gum, wax, resin, lignin, etc., and an externally applied reagent. It may also be present as the result of redistribution within the fiber, as where it is desired to have the constituent uniformly distributed within the fiber.

(2) Note. A digestion process will seldom result in the removal of all the nonfibrous ingredients from vegetable growth. Processes will be classified in this and indented subclasses only when the digestion is purposefully incomplete, as where it is stated that a substantial amount of fiber-impregnating or adhesive matter is retained.

(3) Note. This subclass includes for example the combination of digestion and returning the waste liquor to the pulp as a nonfiber additive.

- 12** This subclass is indented under subclass 10. Processes in which the nonfiber material is added to self-sustaining fibrous web or body which has been deposited or formed from a liquid suspension of the fibers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

158+, particularly subclasses 184+, for the application of a nonfiber additive to a formed fibrous web or article not combined with a liberation or purification of the fibers.

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This subclass is indented under subclass 1. Processes combined with the step of depositing or forming a fibrous web or article from a liquid suspension of the liberated or purified fibers.

(1) Note. Processes including liberating or purifying fibers followed by forming a web or article in which the formation is set forth by name only, as for example, "waterlaying" without including any details of the waterlaying operation, are not classifiable in this subclass but elsewhere on the basis of the particular fiber liberation or purification.

SEE OR SEARCH THIS CLASS, SUBCLASS:

10+, for processes of this type also including the addition of a nonfiber material to the resultant web or article.

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This subclass is indented under subclass 1. Processes combined with the recovery of an organic constituent from the raw fibrous material or a reaction product derived from such constituent, in addition to the liberated fiber.

(1) Note. The organic material recovered must originate or be formed from the fibrous material. Mere separation of the organic material is sufficient unless it is destroyed or discarded.

SEE OR SEARCH THIS CLASS, SUBCLASS:

29+, for digestion or chemical treating processes in which the digestion liquor or treating agent is recovered or reused for treatment of further quantities of fibrous material.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, particularly subclasses 123.11+ for processes of preparation of plastic or coating composition wherein a cellulose liberation liquor is employed.

435, Chemistry: Molecular Biology and Microbiology, subclass 251 and 252 for processes of fermenting cellulose liberation waste liquor not combined with a fiber liberation.

- 530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 205+ for tall oil and its reaction products, and subclasses 500+ for lignins and reaction products thereof.
- 15** This subclass is indented under subclass 14. Processes in which the organic material is recovered from gases given off from a digester.
- (1) Note. An example of gas given off from a digester is that in relief of pressure.
- 16** This subclass is indented under subclass 14. Processes in which the organic material is recovered from waste fiber treating agent or liquor following its separation from the chemically treated fibers.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 29+, for digestion or chemical treating processes in which the digestion liquor or treating agent is recovered or reused for treatment of further quantities of fibrous material.
- 17** This subclass is indented under subclass 1. Processes in which the fibrous material passes substantially continuously into and out of the treating zone.
- (1) Note. The raw fibrous material is continuously fed to, flowed through and discharged from the treating zone with the material normally being admitted and discharged at the same rates. "Continuous batch" processes, characterized by the passage of baskets filled with fibrous material, through a treating solution, are also included.
- 18** This subclass is indented under subclass 17. Processes in which the raw fibrous material is subjected to compression at the point of entrance to the treating zone so as to form a plug sealing off the zone from the exterior thereof.
- 19** This subclass is indented under subclass 17. Processes in which the fibrous material is subjected to a plurality of dissimilar chemical treatments.
- (1) Note. The treatments may be dissimilar in the composition or concentration of the treating medium, the temperature, pressure, or time, of the treatment, etc.
- 20** This subclass is indented under subclass 1. Processes combined with a step of (1) subjecting a nonwood fibrous material to a mechanical attrition step to strip off the husk or outer shell or to separate the fibrous material from nonfibrous material, or (2) subjecting fibrous material to be used in textile operations to a mechanical operation to modify or facilitate the preparation of the fibers for textile use.
- SEE OR SEARCH CLASS:
- 19, Textiles: Fiber Preparation, for processes of decortication fiber preparation not involving any chemical treatment of the fiber.
- 21** This subclass is indented under subclass 1. Processes combined with the separation of the fibers from each other (1) by subjecting them to a sudden and drastic release of pressure, or (2) by projecting the fiber clumps against a solid surface.
- (1) Note. In view of the fact that steam and hot water are considered as chemicals for treating the fiber within the scope of subclass 1 explosion or projection in the presence of steam or hot water is classified herein, even though no other digestion chemical is present.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 247, for apparatus for use in explosion or impact type defibering operations.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclasses 323.4+ apparatus for subjecting cereals to sudden changes in pressure to disrupt the same and produce a puffed food product.
- 241, Solid Material Comminution or Disintegration, subclass 1 for processes for comminuting solid material by explosion and subclass 5 for processes utilizing kinetic energy of projected or suspended material.

- 22** This subclass is indented under subclass 21. Processes in which the fibrous material is treated with a chemical agent other than water or steam usually to facilitate the liberation or purification of the fibrous material.
- 23** This subclass is indented under subclass 1. Processes in which the fibrous material is subjected simultaneously to a mechanical disintegrating or attrition step and a digestion in the presence of a gas at an elevated temperature or pressure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 26, for processes in which the fibrous material is subjected to a simultaneous chemical treatment and mechanical defibration not in the presence of a gas.
- 63, for processes of fiber treatment in the presence of a gas, vapor or mist.
- SEE OR SEARCH CLASS:
- 241, Solid Material Comminution or Disintegration, subclasses 18+ for other disintegration or comminution processes carried out in the presence of a gas or vapor.
- 24** This subclass is indented under subclass 1. Processes combined with mechanical defibration step in which chemical treatment is initiated after the start or the completion of a mechanical defibration of the fibrous material.
- SEE OR SEARCH CLASS:
- 241, Solid Material Comminution or Disintegration, particularly subclasses 15+ for processes of mechanically comminuting defibering fibrous materials with application of a fluid to the material not involving any chemical treatment of the fibrous material.
- 25** This subclass is indented under subclass 24. Processes in which the fibrous material is also subjected to a chemical treatment before the start of the defibering process.
- (1) Note. The chemical treatment prior to the mechanical defibration step is necessarily separate and distinct from that following the start or completion of the defibration, but may employ the same chemicals and conditions of treatment.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 26, for processes involving simultaneous chemical digestion or treatment and mechanical defibration of the fibrous material.
- 26** This subclass is indented under subclass 1. Processes in which the fibrous material is subjected to concurrent attrition or defibration and chemical digestion or treatment.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 17+, for continuous processes for treating fibrous material in which the material is subjected to a chemical treatment and simultaneous defibration.
- 23, for processes of mechanically defibering fibrous material in the presence of a gas at elevated temperature or pressure.
- 24+, for processes in which the chemical treatment is initiated subsequent to the start or completion of mechanical defibration.
- 235, for apparatus for concurrently digesting and chemically treating fibrous material.
- SEE OR SEARCH CLASS:
- 241, Solid Material Comminution or Disintegration, particularly subclasses 15+ for processes of mechanically comminuting defibering fibrous materials with application of a fluid to the material not involving any chemical treatment of the fibrous material.
- 27** This subclass is indented under subclass 1. Processes in which logs or billets of fibrous material are subjected to chemical treatment which does not destroy its log or billet form, which are then subjected to a mechanical grinding or attrition to convert the logs or billets into a defibered form.
- (1) Note. Processes in which the chemical digestion or treatment results in a destruction of the log or billet form fol-

lowed by attrition are classified in the appropriate subclass below on other bases.

SEE OR SEARCH CLASS:

241, Solid Material Comminution or Disintegration, particularly subclasses 15+ for processes of mechanically comminuting defibering fibrous materials with application of a fluid to the material not involving any chemical treatment of the fibrous material.

28 This subclass is indented under subclass 1. Processes combined with (1) a plurality of separate and distinct attrition or defibering steps, or (2) a specifically defined attrition or defibering step.

(1) Note. Processes in which a defibering step subsequent to chemical treatment is claimed broadly as, for example, “defibering” “refining”, “disintegrating”, “comminuting”, etc., are not classified in this subclass but are found in the appropriate subclass below, usually classified on the basis of the chemical treatment. Processes in which subsequent plural distinct defibering steps are included are classified herein even though the defibering steps are recited broadly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for processes including a chemical treatment combined with a broadly recited single attrition step (see (1) Note).
234+, for digester apparatus combined with mechanical defibering means.
261, for other paper making apparatus combined with heating, refining and/or disintegrating means.

SEE OR SEARCH CLASS:

241, Solid Material Comminution or Disintegration, appropriate subclasses for particular attrition processes and means, per se.

29 This subclass is indented under subclass 1. Processes involving (1) the regeneration, reclamation, reuse or recycling (to a fiber treating zone), or (2) the destruction of the digestion or

treating fluid or chemicals after being used at least once for treating a fibrous material.

(1) Note. This and indented subclasses include processes within the scope of the above when combined with a fiber treatment step or such processes not so combined with fiber treatment which are not provided for elsewhere. The preparation of cellulose liberation agents from such waste liquors is found in this or indented subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52, for processes for chemically treating fibrous material in which waste liquor from the digestion is employed solely for the purpose of charging or discharging the fibrous material to or from the treating zone.
60, for processes of chemically treating fibrous material in which the waste liquor is employed for washing a fibrous pulp.
239+, for the combination of a digester and means for recovering waste liquor discharged therefrom.

SEE OR SEARCH CLASS:

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, appropriate subclasses for electrolytic processes of regenerating or treating waste cellulose liberation liquor (e.g., subclasses 689 through 694 for electrolytic treatment of fibrous organic material, subclass 698 for electrolytic treatment of cellulosic organic material, and subclasses 742-761 for electrolytic treatment of water, sewage, or other waste water, etc.).
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses for apparatus for regenerating, reclaiming, or destroying used digestion agents.
423, Chemistry of Inorganic Compounds, appropriate subclasses, for the preparation or recovery of inorganic compounds, not combined with a fiber treating or liberating step and for the

line between the classes see the note to Class 162 in the definition of Class 423, section III, Line and Search Notes.

- 435, Chemistry: Molecular Biology and Microbiology, subclass 262 for processes for the recovery of chemicals from used cellulose digestion agents involving fermentation and not combined with fiber treatment steps.
- 530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 205+ and 500+, for the recovery of organic compound from waste fiber treating agents, not combined with fiber treating steps.
- 588, Hazardous or Toxic Waste Destruction or Containment, appropriate subclasses for destruction of hazardous digestion or treating fluid chemicals.

30.1 With destruction of organic ingredient in or smelting of liquor:

This subclass is indented under subclass 29. Processes which include (a) the destruction of the organic constituent of the waste liquor, or (b) treatment of the product of such destruction to produce a chemical composition for further use in a cellulose digestion process.

- (1) Note. Processes of destruction of the organic constituent of waste liquor by oxidation, as well as such processes when accompanied by smelting of the inorganic constituents of the liquor, are included. Also included are processes of digestion which start with smelt, or a product of the smelt such as an aqueous solution thereof, (e.g., green liquor).
- (2) Note. This and indented subclasses include the preparation of cellulose liberation, a treating liquor from "smelt" derived from wastes of cellulose treating, or liberating processes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 240, for digestion combined with means to heat the used digestion chemicals.

SEE OR SEARCH CLASS:

- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses for apparatus for regenerating, reclaiming, or destroying used digestion agents.
- 423, Chemistry of Inorganic Compounds, appropriate subclasses for the preparation, or recovery of inorganic compounds, not combined with a fiber treating, or liberating step and for the line between the classes, see the note to Class 162, in the definition of Class 423, Lines With Other Classes and Within This Class.

30.11 Treatment of kraft pulping chemicals:

This subclass is indented under subclass 30.1. Subject matter wherein the waste liquor being treated results from the kraft (i.e., sulfate) process for paper fiber liberation.

- 31 This subclass is indented under subclass 30. Processes in which organic constituent suspended in a liquid is oxidized in situ, without removing all the liquid.

- (1) Note. This type of destruction of organic constituent is known as "liquid phase oxidation".

SEE OR SEARCH CLASS:

- 110, Furnaces, subclass 238 for furnaces for burning wet fuel, (e.g., sewage).
- 210, Liquid Purification or Separation, subclass 63 for processes for purifying a liquid by an oxidizing treatment.

- 32 This subclass is indented under subclass 30. Processes in which the original fiber liberation liquor contains an organic compound or an element other than sodium, calcium, magnesium, oxygen, carbon, hydrogen or sulfur.

- 33 This subclass is indented under subclass 30. Processes in which waste liquors from at least two different types of fiber digestion or treatment are mixed before or after destruction of the organic ingredient or smelting.

- 34** This subclass is indented under subclass 30. Processes in which a charge of fibrous material is subjected to two successive dissimilar chemical treatments.
- (1) Note. The dissimilarity may reside in any one or more of the following factors: composition or concentration of the treating medium, the temperature, pressure or time of the treatment, etc.
- 35** This subclass is indented under subclass 30. Processes in which waste liquor is subjected to a destruction of contained organic material or is smelted and subsequently the residue is reconstituted into a cellulose liberation liquor which is chemically different than that originally employed for treating the fibrous material.
- (1) Note. This subclass provides, for example, for the treatment of the waste liquor from a "sulfate" process by smelting and converting the residue into a sulfite type cellulose liberation liquor.
- 36** This subclass is indented under subclass 30. Processes in which the waste liquor from a cellulose digestion with a sulfite or sulfur dioxide is subjected to smelting or the destruction of a contained organic material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
83+, for processes of digesting or treating cellulosic fibrous material with a sulfite or sulfur dioxide.
- 37** This subclass is indented under subclass 29. Processes in which liquor resulting from a chemical treatment of one batch of fibrous material is subsequently used for the chemical treatment of a different batch of fibrous material.
- (1) Note. In this and indented subclasses are placed all processes in which liquor or chemicals from a digestion or fiber treating operation is subjected to treatment which under the disclosure conditions it for reuse for fiber digestion or treatment, regardless of whether the reuse is claimed unless it is positively disclosed that it is reused on the same fibrous material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
41+, for processes in which used treating liquor or agent is reused on the same fibrous material.
- 38** This subclass is indented under subclass 37. Processes which include the addition of chemicals other than water or steam, to waste liquor, prior to reuse thereof.
- (1) Note. The purpose of the addition of chemicals to the used digestion fluid is of no significance. Thus, addition may be for the removal of impurities, as well as for enhancing the chemical activity of the liquor during subsequent use.
- (2) Note. The added chemicals, of the above definition, may be previously unused materials or other regenerated waste liquor, as well as any other material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
45, for the addition of fresh chemicals to digestion fluid while moving in a closed circuit to and from the same fibrous mass.
- 39** This subclass is indented under subclass 38. Processes in which the chemicals are added to the used digestion fluid in the digester in which the regenerated fluid is employed for digesting or treating the second batch of fibrous material.
- 40** This subclass is indented under subclass 37. Processes in which digestion fluid resulting from treatment of one batch of fibrous material is employed without treatment or modification for treatment of a different batch of fibrous material.
- 41** This subclass is indented under subclass 29. Processes in which the used fiber liberation or treating agent is separated from the fibrous mass and returned and reused on the same fibrous material.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
248, for digesters with fluid circulation means.
- 42** This subclass is indented under subclass 41. Processes in which some property of the digestion fluid is altered during the circulation thereof.
- (1) Note. Many of the patents appearing in this subclass involve heating the digestion fluid during circulation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
249, for digesters, combined with means for recirculating the digestion fluid and means for heating the fluid during recirculation.
- 43** This subclass is indented under subclass 42. Processes in which a portion of the fiber treating fluid is removed from the recirculating stream thereof.
- 44** This subclass is indented under subclass 43. Processes in which at least a part of the removed portion of fiber treating fluid is combined with the remainder of the recirculating fiber treating fluid before it is again brought into association with the fibrous mass.
- (1) Note. In many of the patents of this subclass, gases or vapors separated from the fiber treating liquid are recombined therewith.
- 45** This subclass is indented under subclass 42. Processes in which chemicals, other than water or steam, are added to the fiber treating fluid being recirculated.
- (1) Note. The "added chemicals" of the above definition have the significance indicated in (2) Note under the definition of subclass 38.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
38+, for the addition of chemicals to fluid which has been used in treating one
- batch of fibers, to fortify it for use on another batch of fibers.
- 46** This subclass is indented under subclass 41. Processes in which the fluid being circulated consists of steam.
- 47** This subclass is indented under subclass 1. Processes combined with a separation or recovery of heat from the chemical digestion or treatment.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
54, for processes of fiber digestion or treatment combined with means to cool the liquid so as to freeze at least a portion thereof.
239, for a digester combined with means to recover heat therefrom.
- SEE OR SEARCH CLASS:
165, Heat Exchange, appropriate subclasses, for heat exchange methods and apparatus not otherwise provided for.
- 48** This subclass is indented under subclass 1. Processes which involve a treatment of the apparatus employed to clean, preserve or condition it for use in the digestion operation.
- (1) Note. This subclass takes the above steps in combination with digestion or fiber treating steps or such cleaning, preserving, or conditioning steps, per se, if not otherwise provided for. This subclass includes, for example, digestion in the presence of an autocorrosion agent or performed in such a manner as to prevent corrosion of the apparatus.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
199, for processes involving the cleaning, preserving, conditioning or repairing apparatus used in the making of webs or articles from liberated fibers.
272+, for apparatus for performing processes classified in subclass 199.
- SEE OR SEARCH CLASS:
65, Glass Manufacturing, subclass 27 for a glassworking and/or treating process

- including a step of repairing or cleaning of apparatus.
- 134, Cleaning and Liquid Contact With Solids, appropriate subclasses for processes of cleaning, not otherwise provided for, but not combined with fiber digestion.
- 294, Handling: Hand and Hoist-Line Implements, particularly subclasses 141+ for processes of cleaning by electrolysis not combined with fiber digestion.
- 49** This subclass is indented under subclass 1. Processes combined with a step of sampling, or chemically or physically determining some property or characteristic of the fibers or treating fluid.
- (1) Note. The testing, etc., may be performed on fibers or treating fluid without disturbing their normal flow, or upon a sample extracted from such flow.
- (2) Note. Processes which are carried out at specified temperatures, pressures, or "until acid", for example, are not classified in this subclass even though a test or measurement might be necessary to determine the temperature.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 198, for processes of chemically or physically determining some property or characteristic of fibers combined with a paper making operation.
- SEE OR SEARCH CLASS:
- 65, Glass Manufacturing, subclasses 377+ for a glassworking and/or treating process including a step of testing or inspecting.
- 73, Measuring and Testing, especially subclasses 53.03+ for testing physical properties of pulp not combined with fiber digestion.
- 436, Chemistry: Analytical and Immunological Testing, for processes of chemical testing of fibers or digestion fluid not combined with fiber digestion.
- 50** This subclass is indented under subclass 1. Processes in which electrical or radiant energy is directly applied to fibrous material.
- (1) Note. Indirect electrical heating, such as by contact of fibrous material with an electrically heated plate, is not included. Included are, for example, exposure to high frequency electric discharge, corona discharge, ultraviolet or infrared radiation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 192, for processes involving the application of electrical or wave energy directly to an unfinished fibrous web or article.
- SEE OR SEARCH CLASS:
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 689 through 694 for electrolytic treatment of organic fibrous material.
- 51** This subclass is indented under subclass 1. Processes which include a step of controlling odors given off in connection with the fiber treating or digestion process.
- SEE OR SEARCH CLASS:
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 5 for process of deodorizing not otherwise provided for.
- 424, Drug, Bio-Affecting and Body Treating Compositions, subclass 76 for a deodorant composition, per se.
- 588, Hazardous or Toxic Waste Destruction or Containment, appropriate subclasses depending on the chemical composition of the odors.
- 52** This subclass is indented under subclass 1. Processes which include a step of charging a reaction vessel with fibrous material or discharging it therefrom, or from another vessel closely associated therewith, such as a blowpit.

- (1) Note. A broadly recited step of “charging”, “loading”, “discharging”, “blowing”, etc., is not a sufficient basis for placing a process in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 17+, for processes involving continuous charging or discharging of cellulosic material into and out of a reaction vessel.
- 246, for the combination of a digester and means for charging and/or discharging the same.

- 53** This subclass is indented under subclass 1. Processes which include a step of subjecting the fibrous material and/or treating fluid to a subatmospheric pressure.

- (1) Note. Processes in which fibrous material is first subjected to a steaming treatment followed by treatment with a cold liquid which causes condensation of the steam, are not included in this subclass even though a momentary vacuum is caused to exist within the fibrous material.

- 54** This subclass is indented under subclass 1. Processes which include a step of lowering the temperature so as to freeze at least a portion of the liquid employed in the fiber liberation or treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 47, for digestion processes combined with the step of recovering heat therefrom.
- 239, for a digester combined with means to recover heat therefrom.

SEARCH CLASS:

- 62, Refrigeration, appropriate subclasses, for refrigeration processes and apparatus.

- 55** This subclass is indented under subclass 1. Processes combined with a step of separating solid components of the fibrous material undergoing chemical treatment, from one another, in grades or classes according to physical characteristics.

SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, for processes for the separation of solids from solids in grades or classes according to physical characteristics.

- 56** This subclass is indented under subclass 1. Processes combined with a step of applying a mechanical force to the fibrous material, of sufficient magnitude to remove at least a portion of a liquid associated with such material from the cells or surfaces thereof, or to knead or rub the fibrous material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 18, for processes involving compressing, squeezing or compacting of the fibrous material in connection with continuous digestion or continuous charging or discharging of the fibrous material.
- 20, through 28, for processes which include a defibration or comminution of the fibrous material.

- 57** This subclass is indented under subclass 1. Processes which include imparting to the fibrous material and/or fluid treating agent some positive motion during the treating or digestion operation.

- (1) Note. Agitation caused solely by the bubbling or boiling of the treating liquid is not sufficient to place the process in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 17+, for processes of continuous digestion or continuous charging or discharging of the fibrous material.
- 41+, for processes in which the treating fluid is separated from the fibrous material and recirculated to the digestion operation.

- 58** This subclass is indented under subclass 57. Processes in which motion is imparted to the fibrous material and/or treating liquid by rotation of the treating vessel.

- 59** This subclass is indented under subclass 57. Processes in which the fibrous material and/or treating liquid is forced to travel in a closed path by circuit defining elements of the apparatus employed.
- 60** This subclass is indented under subclass 1. Processes combined with a step of passing a nonreactive liquid through the fibrous material so as to remove undesired material therefrom.
- (1) Note. Processes in which the washing is included only broadly, as by name only, are not included but are classified elsewhere on other bases.
- SEE OR SEARCH CLASS:
8, Bleaching and Dyeing: Fluid Treatment and Chemical Modification of Textiles and Fibers, particularly subclass 156 for processes of washing of pulp or fibers.
- 61** This subclass is indented under subclass 1. Processes directed to controlling the conditions of the digestion or fiber treatment, e.g., temperature, pressure, feed of fibers or treating agent, etc.
- (1) Note. Chemical treatment of fibrous material involving the use of a specified pressure or temperature for example is not sufficient by itself to justify classification in this subclass.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
49, for digestion processes combined with a sampling or testing or analysis step.
- 62** This subclass is indented under subclass 61. Processes in which the operating condition controlled is the concentration of a fiber treating agent.
- 63** This subclass is indented under subclass 1. Processes wherein the fibrous material is forcibly and directly contacted with a gas, vapor or mist during digestion or chemical treatment for some purpose other than drying.
- (1) Note. Admission of a gas or vapor into a portion of a reaction vessel in which the fibers are immersed in a liquid is not sufficient basis for classification in this or indented subclasses unless it positively appears that there is direct contact with the fibrous material. Nor is the generation of a gas in situ by a chemical reaction of two liquids sufficient basis for classification in this group of subclasses.
- (2) Note. The gas, vapor or mist may be nonreactive with the fibers.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
23, for processes of digestion including a mechanical defibration in the presence of a gas under elevated temperatures and pressures.
- SEE OR SEARCH CLASS:
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.
- 64** This subclass is indented under subclass 63. Processes in which the gas or vapor is sulfur dioxide.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
83+, for processes of digestion or treatment of fibrous material with a sulfite or sulfur dioxide (not involving gas-fiber contact).
- SEE OR SEARCH CLASS:
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when

there is no hierarchically superior provision in the USPC for the specifically claimed art.

- 65** This subclass is indented under subclass 63. Processes in which the gas or vapor is oxygen, ozone or air.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 69, for processes of fiber digestion or treatment by percolating the treating fluid therethrough, even though the fibrous material may contact the ambient air.

SEE OR SEARCH CLASS:

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

- 66** This subclass is indented under subclass 63. Processes in which the gas, vapor or mist contains chlorine, free or combined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 87+, for processes of digestion or treating fibrous material with a chlorine containing agent (not involving gas-fiber contact).

SEE OR SEARCH CLASS:

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

- 67** This subclass is indented under subclass 66. Processes in which the gas or vapor is chlorine dioxide.

SEE OR SEARCH CLASS:

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

- 68** This subclass is indented under subclass 63. Processes in which steam is the only gas or vapor coming into direct contact with the fibrous material.

SEE OR SEARCH CLASS:

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1+ for continuous gas or vapor phase colloid system (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

- 69** This subclass is indented under subclass 1. Processes in which a mass of fibers is impregnated with a chemical agent to such a limited extent that the agent does not form a continuous liquid phase completely enveloping the fibrous material.

- (1) Note. In many of the patents, a slow digestion of the fibrous material takes place while the material is in storage, as by percolating through a fixed bed of fibrous material.

- 70** This subclass is indented under subclass 1. Processes in which the fibrous material is treated with a particular, identified treating agent or chemical.
- (1) Note. This and indented subclasses also provide for particular treating compositions or mixtures employed in the digestion or treatment. Such compositions are classified with the corresponding process.
- (2) Note. Processes classified in this or indented subclasses may involve a plurality of the same or different distinct treatment steps, the particular agent used must be identified in at least one step.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
30.1+, for processes of preparation of fiber treating agents from smelts or residues left from waste treating agent from a previous digestion.
- SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 115.5+ for chemical treatment or modification of dry paper.
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, appropriate subclasses for subject matter relating to: colloid systems (such as sols*, emulsions, dispersions, foams, aerosols, smokes, gels, or pastes) or wetting agents (such as leveling, penetrating, or spreading); subcombination compositions of colloid systems containing at least an agent specialized and designed for or peculiar to use in making or stabilizing colloid systems; compositions and subcombination compositions specialized and designed for or peculiar to use in breaking (resolving) or inhibiting colloid systems; processes of making the compositions or systems of the class; processes of breaking (resolving) or inhibiting colloid systems; in each instance, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.
- 71** This subclass is indented under subclass 70. Processes in which the fibrous material being treated includes groundwood or sawdust.
- 72** This subclass is indented under subclass 70. Processes in which an organic compound is used as the fiber treating agent.
- (1) Note. Attention is directed to the definitions of Class 260, Chemistry of Carbon Compounds, for the scope of the term "organic compound" and of the various types of organic compound provided for in the subclasses indented hereunder.
- 73** This subclass is indented under subclass 72. Processes which involve the use of inorganic chlorine containing material in addition to an organic compound.
- 74** This subclass is indented under subclass 72. Processes in which a chlorine containing organic compound is used.
- 75** This subclass is indented under subclass 72. Processes in which a fat, fatty oil or a higher fatty acid is employed.
- (1) Note. By "fats" and "fatty oils" is meant the glycerides of higher fatty acids, including naturally occurring mixtures thereof present in a single oil or fat. By "higher fatty acid" is meant a carboxylic acid containing an unbroken chain of at least 7 carbon atoms bonded to a carboxyl group, e.g., lauric, palmitic, stearic, oleic, ricinoleic, linoleic, and behenolic. Where there are several unbroken chains of carbon atoms bonded to the carboxyl group, one of the chains must contain at least 7 carbon atoms. Included in this subclass also are salts, amides, esters and anhydrides of such acids.
- 76** This subclass is indented under subclass 72. Processes in which an organic acid, salt or ester thereof is employed.

- 77** This subclass is indented under subclass 72. Processes in which an alcohol or phenol is employed.
- 78** This subclass is indented under subclass 70. Processes in which a so- called inorganic “per” compound is employed.
- (1) Note. Includes as “per” compounds are those having oxygen atoms bonded to each other, as in hydrogen peroxide and sodium per borate, for example, as well as other “per” compounds having oxygen containing anions such as perchlorates, permanganates, etc.
- 79** This subclass is indented under subclass 70. Processes in which a chemical containing aluminum or a metal having a specific gravity greater than four is employed.
- (1) Note. This subclass includes, for instance, processes of parchmentizing with zinc chloride.
- 80** This subclass is indented under subclass 70. Processes in which a chemical containing phosphorus, boron or silicon is employed.
- 81** This subclass is indented under subclass 70. Processes in which a chemical containing an oxide of nitrogen an acid of a nitrogen oxide or salt thereof is employed.
- 82** This subclass is indented under subclass 70. Processes in which a chemical containing sulfur is employed.
- (1) Note. This subclass includes, for example, processes of parchmentizing with sulfuric acid.
- 83** This subclass is indented under subclass 82. Processes in which a chemical containing a sulfite or free SO_2 is employed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
64, processes of digesting or treating fibers in which the fibers are contacted with sulfur dioxide in the gaseous state.
- 84** This subclass is indented under subclass 83. Processes in which the fibrous material is subjected to a plurality of separate dissimilar chemical treatments, at least one of which involves treatment with SO_2 or a sulfite.
- (1) Note. The separate treatments may differ in composition or concentration of the treating medium, temperature, or pressure, of treatment, etc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
29+, especially subclass 36 for processes of sulfite digestion in which the waste liquor is regenerated, reclaimed, reused or recycled.
- 85** This subclass is indented under subclass 84. Processes in which a chlorine containing material is employed in at least one stage.
- (1) Note. The chlorine containing material may be used in combination with the sulfite or sulfur dioxide in the same stage or in a stage separate therefrom in a multistage process.
- 86** This subclass is indented under subclass 84. Processes in which a hydroxide or carbonate of an alkali metal, ammonium, an alkaline earth metal or magnesium is employed in at least one of the separate treatments.
- (1) Note. The alkali metals are lithium, sodium, potassium, rubidium and cesium.
- (2) Note. The alkaline earth metals are calcium, strontium and barium.
- 87** This subclass is indented under subclass 70. Processes in which a chlorine containing material is employed.
- (1) Note. Many of the patents in this and indented subclasses are directed to the bleaching of fibrous pulps.
- 88** This subclass is indented under subclass 87. Processes in which the fibrous material is subjected to a plurality of separate, dissimilar chemical treatments, at least one of which

- involves treatment with a chlorine containing material.
- (1) Note. The separate treatments may differ in composition or concentration of the treating medium, temperature or pressure, of the treatment, etc.
- 89** This subclass is indented under subclass 88. Processes in which a hydroxide or carbonate of an alkali metal, ammonium, an alkaline earth metal or magnesium is employed in at least one of the separate treatments.
- (1) Note. The alkali metals are lithium, sodium, potassium, rubidium and cesium.
- (2) Note. The alkaline earth metals are calcium, strontium and barium.
- 90** This subclass is indented under subclass 70. Processes in which a hydroxide or carbonate of an alkali metal, ammonium, an alkaline earth metal or magnesium is employed.
- (1) Note. The alkali metals are lithium, sodium, potassium, rubidium and cesium.
- (2) Note. The alkaline earth metals are calcium, strontium and barium.
- 91** This subclass is indented under subclass 1. Processes directed to the digestion or chemical treatment of a particular species or type of cellulosic fibrous material.
- (1) Note. In this and indented subclasses are placed processes of treating and digesting fibrous material of particular specified kinds of sources. In view of the fact that most fiber digesting processes are provided for in preceding subclasses, these subclasses contain many cross references of patents provided for above. Cross references of patents classified in subclasses 100 and 232, disclosing the use of fibers from particular sources, may also be found herein.
- (2) Note. This subclass provides for the digestion of particular species of wood fibers.
- 92** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of petrified vegetable material, such as peat or lignite.
- 93** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of the tissues of the woody stem which are outside the cambium layer of the plant, that is the bark.
- 94** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of bamboo.
- 95** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of raw staple cotton or the short fibers which adhere to cottonseed after the ginning operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
99, for processes of treating the hulls of cottonseeds.
- 96** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of sugar cane after the sugar has been extracted, such cane in crushed or other comminuted form, or is derived from cornstalk.
- 97** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of a cereal grass or straw.
- (1) Note. The most common cereals involved are wheat, rye, oat, barley and rice.
- 98** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of flax, hemp, jute or ramie.
- (1) Note. For the purpose of this subclass, the term "hemp" includes Manila hemp (*Musa textilis*) and sisal hemp (*Agave*) as well as true hemp (*Cannabis sativa*).
- 99** This subclass is indented under subclass 91. Processes directed to the digestion or chemical treatment of fibrous material.

material, other than a wood, not provided for in any of the preceding subclasses (92-98).

- (1) Note. Types of material, the treatment of which is classifiable in this subclass, are noncereal grasses such as esparto, as well as leaves, roots, reeds, stems, seaweed and other forms of aquatic plant life.

100 This subclass is indented under the class definition. Processes, for depositing fibers from a liquid suspension thereof to form an interfelted fibrous product (paper), combinations of such fiber depositing steps with other treatments of the deposited fibrous product, treatments of the deposited product prior to the final drying thereof not otherwise provided for, paper treating processes not otherwise provided for, and products of such processes not otherwise provided for.

- (1) Note. In processes classified in this or indented subclass the fibrous nature of the product must be retained. Processes in which the fibers are converted to a nonfibrous form are classified in the appropriate material working class, e.g., Class 264, Plastic and Nonmetallic Article Shaping or Treating: Processes.
- (2) Note. In this and indented subclasses the articles are usually classified with the corresponding processes, however, certain subclasses by their nature, as for example, those providing for various manipulative procedures, take only processes, the products being old or conventional or classifiable elsewhere on other bases.
- (3) Note. Articles and materials provided for in other classes are not classified in this class (162) merely because they are made of paper (deposited fibers).
- (4) Note. Indented subclasses (141-181) also, include the products under "E." of the class definition of this class (162).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 13, for processes of digesting fibrous material combined with forming a

web or article from the liberated fibers.

- 232, and 252 to 411, 415 and 416, for apparatus for forming paper from fibrous materials.

SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 90.01+ for processes restricted burnishing or the combination of burnishing and calendering of a dried felted fibrous product.
- 34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses, for processes restricted to drying of wet felted material by evaporation of the moisture contained therein.
- 100, Presses, for processes restricted to mechanically expressing liquid from a wet felted web, and processes for calendering a dried web, with or without the steps of moistening and/or drying, the steps of calendering, moistening and drying being taken in any order.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes under the class definition for forming articles from rewetted paper, see References to Other Classes in the class definitions of this class (162) and (1) Note above, see a search note to Class 264.
- 427, Coating Processes, appropriate subclasses, for processes of coating paper not combined with a paper making step, or where the paper is not still wet from the paper forming operation, and for processes of coating dried felted fibrous material.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, appropriate subclasses for making an article from finished paper.

101 This subclass is indented under subclass 100. Processes including a step of forming pores or other type of open space in situ within a felted body during or subsequent to the felting operation, and products of such processes.

- (1) Note. The pores are usually formed by introducing a gas under pressure to the

- interior of the felted body or by generating a gas in situ in such body.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 158+, particularly subclass 181 for formation of porous paper by the addition of a porous material thereto, e.g., expanded perlite.
- SEE OR SEARCH CLASS:
- 106, Compositions: Coating or Plastic, subclasses 601+, and 672+ for processes of making various types of coating or plastic compositions, including a step forming pores in situ in the composition.
- 501, Compositions: Ceramic, subclass 39 and 80+ for pore-forming ceramic compositions.
- 521, Synthetic Resins or Natural Rubbers, subclasses 50+ for pore-forming, per se, in a synthetic resin composition when the composition in which the pores are formed is a synthetic resin.
- 102** This subclass is indented under subclass 100. Processes in which the fibers are deposited from a liquid other than water.
- (1) Note. Liquids are considered to be non-aqueous if the medium includes more than 50 percent of such nonaqueous liquid. Examples of such nonaqueous liquids are alcohols, turpentine, toluene, gasoline, etc.
- 103** This subclass is indented under subclass 100. Processes in which a web or article deposited from a liquid suspension of fibers (waterlaid) is united with a solid preformed body not so deposited either during fiber deposition or prior to final drying thereof, and products of such processes.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 201, for the combination of a process of this class followed by a laminating step such as is provided for in Class 156, Adhesive Bonding and Miscellaneous Chemical Manufacture.
- 219, for processes of forming composite articles consisting of a plurality of separately waterlaid components.
- 267, for apparatus for molding pulp with a nonpulp insert or preform.
- 104** This subclass is indented under subclass 103. Processes in which the nonwaterlaid preform is positioned between and in contact with separately formed waterlaid webs, and the products thereof.
- 105** This subclass is indented under subclass 103. Processes in which the nonwaterlaid preform is a metal, and products of such processes.
- 106** This subclass is indented under subclass 105. Processes in which the metal is disclosed as being used as a conductor of electricity, and the products thereof.
- SEE OR SEARCH CLASS:
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for processes of making electrical conductors of indefinite length, not otherwise provided for.
- 174, Electricity: Conductors and Insulators, appropriate subclasses, for electric conductors.
- 107** This subclass is indented under subclass 103. Processes in which the nonwaterlaid preform contains glass, and the products thereof.
- 108** This subclass is indented under subclass 103. Processes in which the nonwaterlaid preform is a woven fabric or comprises a plurality of parallel strands or filaments; and the products thereof.
- SEE OR SEARCH CLASS:
- 442, Fabric (Woven, Knitted, or Nonwoven Textile or Cloth, etc.), subclasses 181+ for a woven fabric and subclasses 304+ for a knit fabric.
- 109** This subclass is indented under subclass 100. Processes for producing an essentially flat web or sheet having some irregularity or variation from the plane configuration, which variation is slight in proportion to the web's length and width so as not to destroy its essentially flat condition, and the webs or sheets so produced.

- (1) Note. The irregularity may be produced during the deposition of the fibers or by a subsequent treatment of the undried web.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

218+, for processes for the production of discrete and finite shaped articles by deposition of fibers, which shaped articles may have a pronounced irregularity and be nonplanar.

110 This subclass is indented under subclass 109. Processes including a step or redistributing the fibers in the web or sheet or altering their configuration in a limited area of the web or sheet so as to produce a mark or design in the product which is visible when viewed by transmitted light, and the products of such processes.

- (1) Note. The watermark is most frequently produced by a raised or depressed pattern on a dandy roll. In the former case, there is less fiber at the mark than in the balance of the sheet; in the latter case, there is more fiber. In either case, there is a difference in transparency between the area of the mark in the one hand and the balance of the sheet on the other.

111 This subclass is indented under subclass 109. Processes in which the irregularity imparted to the web or sheet is a crinkle, or wrinkle effect known as a “crepe”, usually substantially over the entire surface, and the products of such processes.

- (1) Note. The paper treated may be dry and rewetted for the creping operation, or may still be wet from the papermaking operation during the creping operation.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for corrugating, crinkling, creping and embossing, particularly subclass 183, 205+, 210, and 219+.

428, Stock Material or Miscellaneous Articles, subclasses 153+ for creped paper, and subclasses 174+ for a stock

material product embodying a non-planar uniform-thickness (e.g., corrugated, pleated) component with or without a coating.

112 This subclass is indented under subclass 111. Processes combined with the deposited fibrous material or uniting the deposited layer to a second (1) coating layer and products of such processes.

- (1) Note. The term “coating” signifies both the application of a surface layer to a base, and penetration of the interior of the base by impregnation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

265+, for apparatus for making a paper web or article combined with a coating means.

113 This subclass is indented under subclass 111. Processes combined with a step of deforming the web or sheet in addition to the creping or crinkling, and the products thereof.

114 This subclass is indented under subclass 109. Processes in which the configuration is imparted to the web or sheet by formation of an opening which extends completely through the thickness of the web or sheet, and the products thereof.

- (1) Note. The opening may be formed by a suitable raised or marked portion on the forming means, as well as by subsequent mechanical penetration of the web or sheet.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

286, for apparatus for forming a web or article combined with means to perforate the web or article.

115 This subclass is indented under subclass 109. Processes in which the configuration is imparted to the web or sheet by the direct action of a fluid under pressure thereon, and the products thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

297, for apparatus for making a running or indefinite length web with means to treat the web with fluid pressure acting directly on the work on the mold surface.

- 116** This subclass is indented under subclass 109. Processes in which the configuration is imparted to the web or sheet by deposition of the fibers upon a forming mold having an irregular surface and the products thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

296, for apparatus for forming a running or indefinite length product which includes an irregular or configured forming surface.

- 117** This subclass is indented under subclass 109. Processes in which an irregular configuration is imparted to the web or sheet subsequent to its removal from the surface upon which it was formed, and the products thereof.

SEE OR SEARCH CLASS:

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes within the class definition, which may involve the shaping, molding or embossing a preformed paper sheet either dry or with rewetting thereof.

- 118** This subclass is indented under subclass 100. Processes including a step of winding or wrapping a wet web upon itself, or upon a core to produce a multiply tubular article.

(1) Note. This group of subclasses takes processes of forming tubes by winding followed by cutting the tube axially and flattening it out into a sheet. Products of processes of this and indented subclasses are classified on the basis of the character of the product.

(2) Note. Winding can take place, for example, by (1) passing the web at least once about the longitudinal axis of the article being formed, without displacement of

the web axially of such article, resulting in the formation of a multilayered article, with each turn in close proximity to the immediately preceding and immediately succeeding turns, or (2) by advancing the web axially of the product being made, while revolving the web about such axis, resulting in the formation of a single ply tube.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

123+, for multilayer webs or sheets which may be produced by winding, followed by cutting the tube axially, and flattening it out into a sheet.

283+, for paper making apparatus including means for winding the paper product.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 100 through 178, especially subclasses 129+, 144, 150, and 154 for spirally wound layers or pipes.

242, Winding, Tensioning, or Guiding, subclasses 520+ for convolute winding.

- 119** This subclass is indented under subclass 118. Processes which include the application of a coating to the undried web, either before, during or after winding.

- 120** This subclass is indented under subclass 118. Processes which include a step of cutting the fibrous material or removing a portion thereof, following winding.

- 121** This subclass is indented under subclass 118. Processes combined with a step of heating the fibrous material.

- 122** This subclass is indented under subclass 118. Processes combined with a step of applying mechanical pressure to the fibrous material.

- 123** This subclass is indented under subclass 100. Processes in which a plurality of formed fibrous webs or sheets are united prior to the final drying of at least one of the webs or sheets and the products thereof.

(1) Note. The uniting may be during the formation of one or more of the fibrous lay-

ers or may be accomplished by the folding or lapping of an undried fibrous layer upon itself. For example, the layers must be separately formed, or formed at different times or places, a single source of pulp may supply a plurality of forming means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

118+, for processes in which plural layers are formed by a winding operation. Layered products, not otherwise provided for are found in this or indented subclasses (123+).

188, for processes of producing from a unitary source of pulp suspension or from a plurality of contiguous sources of pulp suspension, a single-ply web or sheet, characterized by a gradual transition or other nonuniformity, in the nature of the fiber, in progressing from one surface of the product to the other.

196, for processes involving a step of folding, twisting or rolling, where the product is not a multilayered web or sheet. Subclass 196 takes processes of producing pulp rovings by rolling a narrow strip of a waterlaid strip upon itself.

203, for processes of producing a homogeneous single-ply web or sheet by means of two forming members, in which two webs, felted on the respective forming means, are in contact with a common pulp bath at the time the webs are joined.

298, for apparatus for applying a plurality of separate streams of fibrous pulp to the same mold surface.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclass 150 and 156+ for pipes produced by winding a web, in a plurality of turns, to desired thickness.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses, for processes of adhesively uniting preformed layers of material.

428, Stock Material or Miscellaneous Articles, appropriate subclasses, for a stock material product in the form of a single or plural layer web or sheet not provided for in any other class.

124 This subclass is indented under subclass 123. Processes in which a nonfibrous material is added between waterlaid webs or sheets, and the products thereof.

(1) Note. The nonfibrous material may be applied in the form of a liquid film, or in the form of granules or flakes. For the purpose of this subclass water is not regarded as coming within the term, "nonfiber".

SEE OR SEARCH THIS CLASS, SUBCLASS:

104, for processes wherein a solid preformed body or layer is positioned between formed fibrous layers.

125 This subclass is indented under subclass 123. Processes in which at least one layer or the fibers thereof differ in some property from another layer or the fibers thereof, and the products thereof.

(1) Note. Examples of properties in which the layers may differ, provided for in this subclass are: density, thickness, width, and absorbency.

126 This subclass is indented under subclass 125. Processes in which at least two layers are of different colors or have different color or other type of visual effects, and the products thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

162, for processes of forming a single fibrous layer having a coloring material added thereto.

127 This subclass is indented under subclass 125. Processes in which at least two layers are associated with different amounts or types of a nonfibrous organic material, and the products thereof.

(1) Note. The difference may reside in the fact that one layer is mixed with an

organic material, while the adjoining layer is free of organic material. The organic material need not be specifically identified. It is sufficient if a functional term such as “sizing”, indicative of the organic nature of the additive, is employed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

158, through 180, for processes of adding nonfibrous organic material to a fiber slurry, pulp or wet web, and the resulting products.

- 128** This subclass is indented under subclass 125. Processes in which at least two layers are associated with different amounts of nonfibrous inorganic material, and the products thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

182, for processes of adding nonfibrous inorganic material to a fiber slurry, pulp or wet web.

- 129** This subclass is indented under subclass 125. Processes in which the fibers of at least two layers differ in some property, and the corresponding products.

(1) Note. The making of a composite product by joining a cellulosic web and an asbestos or animal fiber web is included in this subclass.

- 130** This subclass is indented under subclass 129. Processes in which the fibers of one layer are of a different dimension or range of dimensions from those in another layer, and the corresponding products.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

188, for processes of preparing single ply waterlaid products having a nonuniform distribution of fibers.

- 131** This subclass is indented under subclass 129. Processes in which the major axis of some fibers of one layer are at an angle to the major axis of some fibers in another layer, and the corresponding products.

- 132** This subclass is indented under subclass 123. Processes in which a web or sheet is deposited on each of a plurality of separate forming means and subsequently united after substantial felting of each web or sheet has taken place.

(1) Note. This subclass takes processes in which a plurality of separately formed webs are united while one of the webs is still in contact with its forming means, as well as those in which pressure rolls, momentarily in contact with the work, effect association of the webs.

(2) Note. This subclass does not take products. For products of processes classifiable in this subclass, see the appropriate one of subclasses 123+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

123, through 131, for processes of producing multilayer waterlaid webs or sheets involving the use of a single forming means, or in which a second layer is waterlaid in situ directly on the surface of a previously formed layer, and for products formed by processes classified in this or indented subclasses (132+).

300+, for apparatus for carrying out processes classified in this or indented subclass.

- 133** This subclass is indented under subclass 132. Processes in which the separately formed webs or sheets are brought into association while at least one of them is supported by a member, other than a forming mold, which moves bodily with the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

304, for apparatus for carrying out the processes of this subclass (133).

- 134** This subclass is indented under subclass 100. Processes including a treatment of the web or sheet which provides it with a surface having one or more areas which are different from other areas in coloring or appearance and the resulting products.

- (1) Note. The treatment may take the form of agitation of a web at some stage of its formation, or a specialized coating operation, such as printing or the addition of a medium which provides a mottled or marbled effect. The coating may be in the form of flakes, granules or fibers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 123+, for the formation of a multilayered web, one layer of which bears printing or variegated coloring on a surface.

- 135** This subclass is indented under subclass 100. Processes combined with a step of coating the deposited product after it has been substantially freed of the water derived from a paper making operation.

- (1) Note. The use of water alone as a moistening or humidifying medium on a dry sheet or web is not regarded as coating for the purpose of this group of subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 158+, particularly subclasses 184+, for processes of coating a web or sheet while it is still wet from a waterlaying operation.
225, for processes of board making involving moistening or rehumidification.

SEE OR SEARCH CLASS:

- 252, Compositions, subclass 567 for a paper web or sheet impregnated with a defined liquid dielectric composition.

- 136** This subclass is indented under subclass 135. Processes which include some treatment of the coating after application thereof to the formed paper product.

- (1) Note. For the purposes of classification broad references to drying or calendering of the coating are not regarded sufficient to cause classification in this subclass.

SEE OR SEARCH CLASS:

- 427, Coating Processes, subclasses 331+ for coating combined with a post-treatment of the coating.

- 137** This subclass is indented under subclass 135. Processes which include the application of a plurality of layers of dissimilar coating materials.

- 138** This subclass is indented under subclass 100. Processes for producing a product having specified electrical or magnetic properties, and the resulting products.

SEE OR SEARCH CLASS:

- 252, Compositions, subclass 567 for a paper web or sheet impregnated with a defined liquid dielectric composition.
429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, subclasses 129+ and 247+ for separators combined with battery structure and separators, per se, respectively.

- 139** This subclass is indented under subclass 100. Processes for producing paper disclosed as being suitable for use as the outer covering of a cigarette or cigar, and products thereof.

SEE OR SEARCH CLASS:

- 131, Tobacco, subclass 365 for paper, intended for use as a covering for cigars or cigarettes, which contains tobacco and for cigarette or cigar paper of specified shape or structure specializing it for this use.

- 140** This subclass is indented under subclass 100. Processes for making (1) a product of such specialized structure as to enable one to identify the source or maker thereof or to detect attempts to reproduce such structure by unauthorized persons or (2) a product of such character that attempts to alter its appearance can be detected by visual or other type of sensing means; and resulting products.

- (1) Note. Examples of the type of paper forming the basis of this subclass are: various forms of paper produced by the

Government such as currency, bonds, stamps, visas, and financial instruments such as checks, and bank notes.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 199 for a stock material product which has a developable image or soluble portions which indicate when alterations are attempted, and subclass 916 (a cross-reference art collection) for a product which indicates attempts at tampering therewith.

141 This subclass is indented under subclass 100. Processes involving the deposition of fibers from a liquid suspension containing a plurality of different types of fibers, so as to form a single layer (web or article) in which the different fibers are homogeneously distributed, and the resulting products.

(1) Note. Different types of fibers must be deposited to form the product to justify classification of processes and products in this or indented subclass. Thus, this group excludes processes of treating a slurry of two types of fibers in such a way that one type is gelatinized to the point where it completely loses its fibrous nature.

(2) Note. This subclass (141) contains processes of forming pulps or paper products from mixtures of pulps from different wood sources, as well as pulps derived from different chemical treatments of the same or different woods, e.g., a mixture of kraft and sulfite pulps.

(3) Note. This subclass includes the products under "E." of the class definition of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

188, for processes of producing a web or article having a nonuniform distribution of mixed fibers, and the resulting products, as where coarse fibers are concentrated at one portion, and fine fibers at another, with or without a

gradual transition in respective fiber content at intermediate points.

SEE OR SEARCH CLASS:

428, Stock Material Miscellaneous Articles, appropriate subclasses, for a fiber or fiber containing single or plural layer stock material product with either internal structure (e.g., crimped fiber), or external structure (e.g., corrugated sheet), where the sole disclosed method of manufacture is some process (e.g., air-laying), other than a process of fiber deposition from a liquid suspension.

142 This subclass is indented under subclass 141. Processes and products in which one of the fibrous components is undigested cellulosic fiber, such as groundwood or sawdust.

SEE OR SEARCH THIS CLASS, SUBCLASS:

71, for processes involving the chemical liberation or purification of groundwood or sawdust.

150, for processes and products in which undigested cellulosic fibers constitute the sole fibrous component.

143 This subclass is indented under subclass 141. Processes and products in which one of the fibrous components is proteinaceous or are fibers of animal origin.

SEE OR SEARCH THIS CLASS, SUBCLASS:

151, for processes and products in which animal or proteinaceous fibers constitute the sole fibrous material.

144 This subclass is indented under subclass 143. Processes and products which include leather fibers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

151, for processes and products in which leather fibers constitute the sole fibrous material.

145 This subclass is indented under subclass 141. Processes and products in which one of the fibrous components is mineral in origin.

- (1) Note. The mineral fibers most frequently used are asbestos and glass.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
152+, for processes and products in which mineral fibers constitute the sole fibrous material.
- 146** This subclass is indented under subclass 141. Processes and products in which one of the fibrous components comprise synthetically produced fibers.
- (1) Note. Examples of synthetic fibers are synthetic resins, cellulose esters and chemically modified cellulosic fibers.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
157.1, for processes and products in which synthetic fibers constitute the sole fibrous material.
- 147** This subclass is indented under subclass 141. Processes and products in which one of the fibrous components comprises fabric, rags, or previously used rags.
- (1) Note. For the purpose of this subclass, broke, trim and wet lap are not regarded as waste paper.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
4+, for processes for chemically liberating or purifying fiber from textile wastes, waste paper, etc.
191+, for processes of recovering pulp, in the form of broke, trim or wet lap.
- 148** This subclass is indented under subclass 141. Process and products in which one fibrous component comprises fibers from a nonwood source.
- (1) Note. Cotton, bagasse, straw and flax are examples of nonwood fibers found in this subclass.
- 149** This subclass is indented under subclass 141. Processes and products in which the fibrous component differ from each other in dimension.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
188, for processes of producing a web or sheet having a nonuniform distribution of fibers of different dimensions, and the resulting products, as where coarse fibers are concentrated at one portion, and fine fibers at another, with or without a gradual transition in respective fiber content at intermediate points.
- 150** This subclass is indented under subclass 100. Processes and products which include undigested cellulose, such as groundwood or sawdust.
- (1) Note. This subclass includes the products under "E." of the class definition of this class.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
142, for processes and products which include undigested cellulose fiber mixed with a different fiber.
- SEE OR SEARCH CLASS:
428, Stock Material Miscellaneous Articles, appropriate subclasses, for a fiber or fiber containing single or plural layer stock material product with either internal structure (e.g., crimped fiber), or external structure (e.g., corrugated sheet), where the sole disclosed method of manufacture is some process (e.g., air-laying), other than a process of fiber deposition from a liquid suspension.
- 151** This subclass is indented under subclass 100. Processes and products which include proteinaceous fibers or fibers of animal origin.
- (1) Note. This subclass includes the products under "E." of the class definition of this class.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 2, for processes of chemically liberating or purifying animal fibers.
 143+, for processes and products containing animal or proteinaceous fibers mixed with a different fiber.
- SEE OR SEARCH CLASS:
 428, Stock Material Miscellaneous Articles, appropriate subclasses, for a fiber or fiber containing single or plural layer stock material product with either internal structure (e.g., crimped fiber), or external structure (e.g., corrugated sheet), where the sole disclosed method of manufacture is some process (e.g., air-laying), other than a process of fiber deposition from a liquid suspension.
- 152** This subclass is indented under subclass 100. Processes and products which contain mineral fibers.
- (1) Note. This subclass includes the products under "E." of the class definition of this class.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 3, for processes of chemically liberating or purifying mineral fibers.
 145, for processes and products containing mineral fibers mixed with a different fiber.
- SEE OR SEARCH CLASS:
 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 110 for forming articles by uniting randomly associated particles of mica.
 428, Stock Material Miscellaneous Articles, appropriate subclasses, for a fiber or fiber containing single or plural layer stock material product with either internal structure (e.g., crimped fiber), or external structure (e.g., corrugated sheet), where the sole disclosed method of manufacture is some process (e.g., air-laying), other than a process of fiber deposition from a liquid suspension.
- 153** This subclass is indented under subclass 152. Processes and products which include asbestos fiber.
- SEE OR SEARCH CLASS:
 588, Hazardous or Toxic Waste Destruction or Containment, appropriate subclasses dealing with asbestos.
- 154** This subclass is indented under subclass 153. Processes and products in which Portland cement is associated with asbestos.
- SEE OR SEARCH CLASS:
 106, Compositions: Coating or Plastic, subclass 703 for plastic or coating compositions, not deposited from a suspension, which include Portland cement and a fibrous filler, (e.g., asbestos).
- 155** This subclass is indented under subclass 153. Processes and products which include an organic material in addition to asbestos.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 145, for processes and products which include a mixture of asbestos and an organic fibrous material.
- 156** This subclass is indented under subclass 152. Processes and products which include glass fibers.
- SEE OR SEARCH CLASS:
 65, Glass Manufacturing, subclasses 2+ for a process of making glass fibers or mineral wool.
- 157.1 Synthetic fiber (including chemically modified cellulose):**
 This subclass is indented under subclass 100. Processes and products which include synthetically produced fibers or chemically modified natural fibers.
- (1) Note. This subclass takes the formation of felted products from such fibers as regenerated cellulose, cellulose ethers and esters, synthetic resins, and wool-like cellulosic fibers, as well as such formation combined with the synthetic pro-

duction or chemical modification of the fibers, in any sequence.

- (2) Note. This subclass includes the products under "E." of the class definition of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

146, for processes and products which include such synthetic fibers in admixture with other fibers.

SEE OR SEARCH CLASS:

428, Stock Material Miscellaneous Articles, appropriate subclasses, for a fiber or fiber containing single or plural layer stock material product with either internal structure (e.g., crimped fiber), or external structure (e.g., corrugated sheet), where the sole disclosed method of manufacture is some process (e.g., air-laying), other than a process of fiber deposition from a liquid suspension.

157.2 Synthetic resin:

This subclass is indented under subclass 157.1. Processes and products in which the fibers consist of synthetic resin, that is, complex organic compounds produced from ingredients which are nonresinous in themselves and which compounds simulate natural resins in that they are usually adapted for forming films or fibers or for use as binders in plastic compositions.

- (1) Note. Fibers which are primarily carbohydrates or derivatives thereof are excluded from this subclass or subclasses indented hereunder.

157.3 Polyamide, polyester or polyurethane:

This subclass is indented under subclass 157.2. Processes and products in which the fibers consist of synthetic resin containing recurring amides, ester or carbonic acid half amides, half ester, i.e., urethane groups in the main polymer chain.

157.4 Polymerized unsaturated compound:

This subclass is indented under subclass 157.2. Processes and products in which the fibers consist of an addition polymer through carbon to

carbon unsaturation, i.e., a double or triple bond linking two adjacent carbon atoms.

157.5 Hydrocarbon or halohydrocarbon:

This subclass is indented under subclass 157.4. Processes and products in which the fibers are carbon to carbon unsaturated compounds containing only carbon and hydrogen or carbon, hydrogen and halogen.

157.6 Cellulosic:

This subclass is indented under subclass 157.1. Processes and products in which the fibers consist of cellulosic material.

157.7 Regenerated cellulose, viscose or rayon:

This subclass is indented under subclass 157.6. Processes and products in which the cellulosic fibers include regenerated cellulose, viscose or rayon.

158 This subclass is indented under subclass 100. Processes and products in which a nonfibrous material, other than the suspending water is added, either to the fibrous material prior to deposition, or to the deposited fibrous product prior to the final drying thereof, and the fibrous products so produced.

- (1) Note. The added material need not remain in the ultimate product, but may be merely transitory. Processes and products are, in general, classified in this and indented subclasses on the basis of the particular additive, subclass 183 providing for processes which involve some particular manipulation of incorporation (many by way of cross references).

- (2) Note. The scope of indented subclasses providing for particular additives is determined by the definition of the class or subclass providing for the particular additive, per se, e.g., Classes 23, Chemistry: Physical Processes and 260, Chemistry of Carbon Compounds.

- (3) Note. This subclass includes the products under "E." of the class definition of this class.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 10+, for processes of chemically liberating or purifying fiber combined with incorporating a nonfiber material in the final product.
- 135+, for processes of forming a fibrous web combined with incorporating a nonfiber material after final drying of the fibrous web or article.

SEE OR SEARCH CLASS:

- 428, Stock Material or Miscellaneous Articles, appropriate subclasses, for a coated, impregnated, or bonded stock material product, not elsewhere provided for, and appropriate subclasses for a fiber or fiber containing single or plural layers stock material product with either internal structure (e.g., crimped fiber) or external structured (e.g., corrugated or pleated) where the sole disclosed method of manufacture is some process (e.g., air-laying) other than a process of fiber deposition from a liquid suspension.
- 159** This subclass is indented under subclass 158. Processes and products in which the additive renders the final fibrous product fireproof.
- (1) Note. Patents are placed in this subclass only when the additive has the specific effect of imparting fireproof qualities.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, subclasses 15.05+ for fireproofing coating compositions.
- 252, Compositions, subclasses 601+ for fire retarding agents.
- 428, Stock Material or Miscellaneous Articles, subclass 921 for an art collection of flameproof products.
- 160** This subclass is indented under subclass 158. Processes and products which include a nonfiber additive which acts as a preservative for the paper or is an agent for preventing oxidation.
- (1) Note. Processes and products which preserve paper merely by exclusion of the atmosphere are not included, such pro-

cesses and products are usually classified on the basis of the identity of the nonfiber additive.

SEE OR SEARCH CLASS:

- 252, Compositions, subclasses 380+ for preservative agents.
- 426, Foods and Edible Material: Processes, Compositions, and Products, subclass 138, 178+, for food products having antioxidants and subclass 228, for a food antioxidant, per se.

- 161** This subclass is indented under subclass 160. Processes and products in which the additive has the affect of destroying living plants or animals, (e.g., a poison).

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, subclasses 15.05+ for biocidal and antifouling coating compositions.
- 424, Drug, Bio-Affecting and Body Treating Compositions, appropriate subclass for a composition for destroying an animal or micro-organism, i.e., a biocidal composition. See especially subclasses 27+ for a paper base (carrier or vehicle) coated or impregnated with a composition of that class.
- 504, Plant Protecting and Regulating Compositions, subclasses 116.1 through 367 for a composition for destroying plant life (including algae), especially subclasses 150+ for processes of killing algae, which may be part of a slime material, which are no more involved than the mere addition of a compound or composition to the slime material.

- 162** This subclass is indented under subclass 158. Processes and products including the addition to the fibers of (1) a dye, or (2) a pigment or chemical agent which produces a color in the product other than white.

- (1) Note. If a "pigment" is claimed, there must be a positive disclosure that the product has a color other than white, in order to justify inclusion of a process or product in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 126, for processes of producing a multilayered web or sheet in which the layers have different colors and products thereof.
- 181.1, for processes and products which include a pigment such as calcium carbonate, titanium dioxide, etc., which impart a white color.

SEE OR SEARCH CLASS:

- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, see subclasses 400 through 696 for processes of dyeing finished dry paper.

163 This subclass is indented under subclass 158. Processes and products in which the additive is derived in whole or in part from the fibers being treated.

- (1) Note. The nonfiber material may be extracted from the raw fiber-containing material and later added to the same batch of material from which it was derived, or to a different batch. The non-fiber material may also be the reaction product of an original constituent of the plant, such as a gum, wax, resin, lignin, etc., and an externally applied reagent. It may also be present as the result of redistribution within the fiber, as where it is desired to have the constituent uniformly distributed within the fiber.
- (2) Note. The fact that the fiber present in a process or product claimed is identified as "lignocellulose" is not, by itself, a sufficient basis for classification in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 11, for processes involving the steps of chemical liberation or purification, and adding to or retaining with the fibers, a nonfiber material of the type provided for in subclass 163.

164.1 Synthetic resin:

This subclass is indented under subclass 158. Subject matter including a so-called synthetic resin, that is, complex organic compounds resembling natural resins prepared from non-resinous ingredients.

SEE OR SEARCH CLASS:

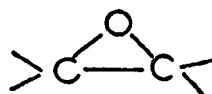
- 520, Synthetic Resins or Natural Rubbers, particularly Classes 523 and 524 for synthetic resin or natural rubber composition which is not deposited from a liquid suspension.

164.2 Ion exchange resin or molecular sieve:

This subclass is indented under subclass 164.1. Subject matter wherein the synthetic resin is a cross-linked polymer carrying acid or basic groups which may be chemically reacted to substitute therefor anions or cations from other substances of opposite polarities, or substances such as some zeolites having channels within their structure large enough to admit small molecules such as water, but not large enough to admit larger molecules of the order of the size of benzene.

164.3 Epoxy containing reactant:

This subclass is indented under subclass 164.1. Subject matter wherein the synthetic resin is made in part from a reactant having the following group:



- (1) Note. Typical disclosures classified herein recite as one of the resin forming reactants as epihalohydrin, such as epichlorohydrin.

164.4 Silicon containing:

This subclass is indented under subclass 164.1. Subject matter wherein the synthetic resin molecules include the element silicon.

- (1) Note. Typical resins included in claims for this subclass are (e.g., silicones, siloxanes, etc.).

164.5 Sulfur containing:

Subject matter under 164.1 wherein the synthetic resin molecules include the element sulfur.

- (1) Note. The synthetic resin may be, e.g., a polysulfonium resin, etc.

164.6 Nitrogen containing:

This subclass is indented under subclass 164.1. Subject matter wherein the synthetic resin molecules include the element nitrogen.

- (1) Note. The synthetic resin may be, e.g., polyamide, a polyamine, a polyimine, etc.

164.7 Ester type:

This subclass is indented under subclass 164.1. Subject matter wherein the synthetic resin is the reaction product of an alcohol or phenol and an organic acid.

- (1) Note. The synthetic resin may be e.g., vinyl acetate, an acrylate, a reaction product of a polyhydroxy alcohol, and a polybasic acid (such as the alkyd resins), etc.

165 This subclass is indented under subclass 164. Processes and products including a phenol-aldehyde reaction product resin.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, particularly Classes 523 and 524 for a synthetic resin composition which is not deposited from a liquid suspension.

166 This subclass is indented under subclass 164. Processes and products including an amine- or amide-aldehyde reaction product resin.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, particularly Classes 523 and 524 for a synthetic resin composition which is not deposited from a liquid suspension.

167 This subclass is indented under subclass 166. Processes and products in which the resin is prepared or is reacted with an organic material other than the amine or amide and aldehyde.

168.1 Polymerized unsaturated compound:

This subclass is indented under subclass 164.1. Processes and products in which the resin has been prepared by polymerization of an ethylenically unsaturated organic compound.

SEE OR SEARCH CLASS:

260, Chemistry of Carbon Compounds, subclass 17.4 for compositions including polymerized unsaturated resins and cellulose which have not been deposited from liquid suspension.

168.2 Nitrogen containing compound:

This subclass is indented under subclass 168.1. Processes in which the unsaturated compound contains at least one atom of nitrogen.

SEE OR SEARCH THIS CLASS, SUBCLASS:

164.6, for similar processes wherein the nitrogen containing compound is not ethylenically unsaturated.
166+, for similar processes wherein the nitrogen containing compound is an amine, or amide-aldehyde.

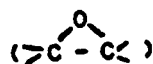
168.3 Acrylamide containing:

This subclass is indented under subclass 168.2. Processes in which the nitrogen containing compound is an amide of acrylic acid, or of an analogue of acrylic acid.

- (1) Note. The nitrogen containing compound may be, e.g., methacrylamide, etc.

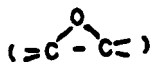
168.4 Heterocyclic N or S or epoxy component:

This subclass is indented under subclass 168.3. Subject matter wherein one component of the polymer contains a heterocyclic nitrogen or sulfur containing group or an epoxy group as below:

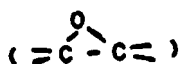


168.5 Heterocyclic N or S epoxy component:

Subject matter under subclasses 168.2 wherein one component of the polymer contains a heterocyclic nitrogen or sulfur containing group or an epoxy group as below:

**168.6 Hetero S or epoxy component:**

This subclass is indented under subclass 168.1. Subject matter wherein the unsaturated monomer contains a heterocyclic sulfur containing group, or an epoxy group as below:

**168.7 Ester type:**

This subclass is indented under subclass 168.1. Subject matter wherein the unsaturated monomer is the reaction product of an alcohol, or a phenol with an acid.

169 This subclass is indented under subclass 168.1. Processes and products in which the unsaturated compound (monomer) which is polymerized has more than one ethylene type bond, e.g., butadiene.

170 This subclass is indented under subclass 158. Processes and products which include a natural hydrocarbon gum (rubber).

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, particularly Class 524, subclass 13 and 35+ for a rubber composition containing cellulose and which is not deposited from a liquid suspension.

171 This subclass is indented under subclass 158. Processes and products which include a bituminous material such as asphalt, tar, tarry residues, etc.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, particularly subclass 164.12, 164.6, 166.7, 169.54, 170.56, and 196.1 for

compositions comprising cellulose and bituminous material which are not deposited from a liquid suspension.

172 This subclass is indented under subclass 158. Processes and products which include a wax.

(1) Note. The wax may be either an ester type wax, e.g., beeswax or a hydrocarbon wax, e.g., paraffin.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, subclass 164.42, 166.51, 166.7, 169.21, 169.54, 170.56, 196.1, and 203.3 for composition comprising cellulose and wax which are not deposited from a liquid suspension.

173 This subclass is indented under subclass 158. Processes and products which include a hydrocarbon.

174 This subclass is indented under subclass 158. Processes and products which include a nonfibrous proteinaceous material.

(1) Note. Cereal flours, such as corn, oat, wheat, etc., are proteinaceous material for purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143+, for processes and products including cellulose and a fibrous proteinaceous material.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, subclass 126.3, and 136.1+ for compositions including a protein and cellulose which are not deposited from liquid suspension.

175 This subclass is indented under subclass 158. Processes and products in which the additive is a carbohydrate.

176 This subclass is indented under subclass 175. Processes and products which include, as the additive, cellulose in a nonfibrous form.

(1) Note. Examples of nonfibrous cellulose are regenerated cellulose and cork.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
141+, for processes and products which include a mixture of two or more types of fibrous cellulose.
- 177** This subclass is indented under subclass 175. Processes and products which include a nonfibrous cellulose derivative, such as a cellulose ether or ester.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
146, and 157.1, for processes and products including chemically modified cellulosic fibers or synthetic cellulose derivative fibers.
- 178** This subclass is indented under subclass 175. Processes and products which include a carbohydrate gum, e.g., gum tragacanth.
- 179** This subclass is indented under subclass 158. Processes and products which include a fat, fatty oil, or higher fatty acid.
- (1) Note. A higher fatty acid is a monocarboxylic acid containing an unbroken chain of at least seven carbon atoms bonded to the carboxylic group, e.g., lauric, palmitic stearic, etc. Fats and fatty oils are glycerides of higher fatty acids including naturally occurring mixtures thereof. This subclass includes those derivatives or modifications of these substances as do not involve the destruction of the carboxylic group and also those modifications which involve the conversion of the carboxylic group into derivatives which upon hydrolysis reverts to a carboxylic group, e.g., salts, esters, amides, acid halides, etc.
- SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, subclass 164.11, 164.43, 169.22, 169.26+, 170.23+, and 179.1 for compositions including cellulose and a fat, fatty oil, higher fatty acid or salt which are not deposited from a liquid suspension.
- 180** This subclass is indented under subclass 158. Processes and products which include a natural resin or derivative thereof.
- (1) Note. Many of the patents in this subclass include rosin or rosin soap sizing for the paper. Merely stating that the paper is "sized" is insufficient to cause classification herein unless it positively appears that a natural resin is employed.
- SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, subclass 137.5, 164.41+, 166.51, 169.18+, 170.21, 178.1, and 203.3 for compositions including a natural resin or derivative thereof and cellulose which are not deposited from a liquid suspension.
- 181.1 Inorganic:**
This subclass is indented under subclass 158. Processes and products which include an inorganic nonfibrous material, other than water.
- (1) Note. Many patent in this subclass are directed to processes and products which include a filler. Mere recitation of a filler broadly without identifying the material is not enough to cause classification herein.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
162, for processes and products including an inorganic filler or pigment which imparts a color other than white to the product.
- 181.2 Metal salt other than silicate:**
This subclass is indented under subclass 181.1. Subject matter comprising a metal salt other than a salt of silicic acid.
- 181.3 Sulfate or sulfite:**
This subclass is indented under subclass 181.2. Subject matter wherein the salt is a salt of H₂SO₄ or H₂SO₃.

181.4 Metal oxide or hydroxide:

This subclass is indented under subclass 181.1. Subject matter comprising a binary compound of oxygen and a metallic element or a metallic element connected to an -OH group.

181.5 Metal other than alkali metal, magnesium, or alkaline earth metal:

This subclass is indented under subclass 181.4. Subject matter wherein the metal is not a Group IA metal nor Mg, Ca, Sr, or Ba.

181.6 Silicon containing additive other than clay:

This subclass is indented under subclass 181.1. Subject matter comprising a silicon containing substance other than those substances considered to be clays.

181.7 Alkali metal silicate:

This subclass is indented under subclass 181.6. Subject matter wherein the silicon containing substance comprises lithium, sodium, potassium, rubidium or cesium silicate.

181.8 Clay:

This subclass is indented under subclass 181.1. Subject matter wherein the inorganic substance comprises any substance considered to be a clay.

- (1) Note. See the Glossary in the main class definition of Class 501, Compositions: Ceramic, for the definition of the term clay.

181.9 Free metal or free carbon containing:

This subclass is indented under subclass 181.1. Subject matter comprising a metal or carbon in elemental form.

182 This subclass is indented under subclass 158. Processes including a treatment of fibers prior to addition of a nonfibrous medium to a fibrous slurry, which so conditions the fibers that the medium will coat or impregnate them upon addition to the slurry.

- (1) Note. The treating agent usually imparts to the fiber an electrostatic charge opposite in polarity to that of the coating medium.

- (2) Note. The processes of this subclass are to be distinguished from coating of fibers by adding a precipitating agent to a fiber slurry after the nonfibrous coating medium has been associated with the slurry.

- (3) Note. Most of the patents in this subclass are cross references from subclasses 158 through 181, since in processes of the type under consideration, the nonfiber additive is usually specifically identified in the claims.

183 This subclass is indented under subclass 158. Processes which are drawn to a particular manipulative procedure of adding a nonfibrous material to pulp or a wet web, sheet or article.

- (1) Note. This and indented subclass are intended to be the collecting place for disclosures of particular manipulative procedures for incorporating a nonfibrous additive with the fibers during manufacture of fibrous webs or articles which procedures are or appear of general application to various types of additives. Since most processes specifically identify the additive which is generally provided for in a prior subclass, many of the patents herein are cross references from previous subclasses, particularly subclasses 159 to 181.

184 This subclass is indented under subclass 183. Processes in which the nonfibrous material is added to a formed web or article after it has been deposited from the liquid suspension.

- (1) Note. The nonfibrous material may be added to the web before or after removal of the web or article from the forming means but must be prior to final drying.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 12, for processes reciting chemical liberation or purification of cellulosic material followed by adding nonfibrous material to a web formed therefrom.
135+, for processes in which the web or article forming step is combined with the

addition of a nonfibrous material after final drying.

185 This subclass is indented under subclass 184. Processes in which a portion of the nonfiber material additive is added to the fibrous material before the material is deposited from the liquid suspension.

186 This subclass is indented under subclass 184. Processes in which the nonfibrous material is added to the deposited web or article while it is still on the forming mold.

(1) Note. This subclass includes the addition of nonfibrous material to wet fibrous material on the forming means, at any time after its initial contact therewith.

187 This subclass is indented under subclass 100. Processes and products in which the cellulosic fibers are chemically or physicochemically united with water to produce a hydrated or partially gelatinized fiber.

(1) Note. The water is usually associated with the fibers by being agitated therewith, as in a beater or Jordan. The fibers may also be subjected to mechanical comminution simultaneously with the hydration. In all processes in which fibers are treated in suspension or in the presence of water some hydration may take place. Processes of this character are not classified herein unless the hydration or gelatinization is distinctly disclosed.

SEE OR SEARCH CLASS:

127, Sugar, Starch, and Carbohydrates, subclass 37 for the hydrolysis of cellulose in the manufacture of other carbohydrates.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes for shaping or molding plastic materials within the class definition, which may involve gelatinization of a web or body so as to destroy the fibrous or felted nature thereof. See the class definition of this class (162), Lines With Other Classes and Within This

Class and see References to Other Classes, in reference to Class 264, under "SEARCH CLASS".

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semcontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specially claimed art.

188 This subclass is indented under subclass 100. Processes and products characterized by a difference in some property of the fibers between two portions of the interior or between a portion of the interior and a portion of the surface.

(1) Note. The product must have been by a single waterlaying operation. The non-uniform internal structure may be produced during waterlaying or by a subsequent operation.

(2) Note. The most frequent types of non-uniformity encountered are differences in fiber orientation, fiber size, density, and amount of additive associated with the fibers at different portions of the thickness of the product.

189 This subclass is indented under subclass 100. Processes including a step of recovering for reuse some material used in the fiber deposition, or portions of the deposited product.

190 This subclass is indented under subclass 189. Processes involving the recovery of the aqueous fiber suspending medium (white water) for reuse in a subsequent fiber deposition or other paper making step.

191 This subclass is indented under subclass 189. Processes in which all or part of a body of uncured deposited fibrous material is recovered for reuse in a paper making operation usually the waste or trimmings from the formed web.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 4+, for processes of recovering paper waste which include a step of chemically digesting or purifying the fibrous material.
- 192** This subclass is indented under subclass 100. Processes including the step of treating the material directly with electrical, radiant or wave energy.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 50, for other processes for treating fibrous material with electrical or wave energy.
- SEE OR SEARCH CLASS:
 118, Coating Apparatus, subclass 620 for coating apparatus utilizing electrical or wave energy, and see especially the Notes thereto for the locus of other patents relating to this step.
 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 689 through 694 for electrolytic treatment of organic fibrous material.
- 193** This subclass is indented under subclass 100. Processes including a step of facilitating the handling of a web of fibrous material by forming a narrow tongue-like portion on the leading end of the web or including the manipulation of such narrow tongue like portion through the paper making or treating device.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 255, for apparatus having means automatically forming a lead strip.
 286, for cutting means forming a lead strip.
- 194** This subclass is indented under subclass 100. Processes including a step of severing, cutting or slitting the fibrous product.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 286, for apparatus there provided for including means to sever the fibrous body, and see especially the notes thereto for the locus of other art relating to the severing, per se, of fibrous bodies.
- 195** This subclass is indented under subclass 194. Processes in which the severing operation occurs because of the action of a thin fluid jet on the product.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 286, for apparatus including a fluid jet for severing or slitting.
- 196** This subclass is indented under subclass 100. Processes in which the deposited web or article, is subjected to a folding, twisting or rolling prior to the final drying thereof.
- (1) Note. The process may include a step of unfolding, untwisting or unrolling, so that the web or sheet is returned to its original configuration but with modified properties.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 118+, for processes in which the web is wound upon itself during deposition so as to form a plurality of united layers.
 123+, for processes of folding a single web or sheet into one or more folds, so as to produce a structure having at least two superposed layers united so as to form a multilayered product.
- 197** This subclass is indented under subclass 100. Processes including a step of distorting the product by stretching, subjecting a product to tensile force, repeatedly bending a product to physically modify the product without altering its shape, or restoring a distorted normally planar sheet to its original planar configuration by a mechanical shaping step.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 270, for apparatus performing similar functions.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for stretching, stressing, shaping and deforming steps combined with laminating. See particularly subclasses 160+, 196+ and 229.

- 198** This subclass is indented under subclass 100. Processes combined with a step of subjecting the product (1) to a quantitative determinative, (2) to a visual inspection, or (3) to a testing procedure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

49, for processes of fiber treatment there provided for combined with a testing, sampling or analyzing step, and see Notes thereto for the locus of patents relative to testing, per se.

263, for paper making apparatus combined with measuring or testing means.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 64 for methods of measuring, testing or inspecting, in combination with a laminating step.

- 199** This subclass is indented under subclass 100. Processes including a step of preparing the apparatus for the paper making operation or of placing it in better condition to perform its function or of removing undesirable residue of the paper making operation, from the apparatus, not otherwise provided for.

SEE OR SEARCH CLASS:

134, Cleaning and Liquid Contact With Solids, appropriate subclasses, for cleaning processes not otherwise provided for.

- 200** This subclass is indented under subclass 199. Processes including a step of removing or inserting an endless foraminous forming surface or wire from or into a paper making apparatus.

- 201** This subclass is indented under subclass 100. Processes combined with a step of treating the fibrous material either before or after deposition not otherwise provided for.

(1) Note. This subclass includes combinations of waterlaying with such operations, not provided for in this class, as mechanical comminution of solids (Class 241, Solid Material Comminution or Disintegration), and adhesively bonding the waterlaid product to a solid preform which bonding operation, per se, is classified in Class 156, Adhesive Bonding and Miscellaneous Chemical Manufacture.

- 202** This subclass is indented under subclass 100. Processes peculiarly adapted to the production and/or treatment of endless fibrous webs.

(1) Note. In this and the indented subclasses may be found (1) processes for producing a fibrous web from a water slurry, (2) certain processes not elsewhere provided for, treating a fibrous waterlaid web either during or after manufacture of the web, and (3) combinations of (1) and (2) above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

218+, for processes producing or treating discrete articles as distinguished from endless webs.

289, for paper making apparatus producing and/or treating a running length product.

- 203** This subclass is indented under subclass 202. Processes in which a unitary fibrous web is produced by continuously introducing slurry between separate face-to-face foraminous molds whereby formation and interfelting of the fibers occurs at both faces of the web.

(1) Note. Merely treating a web while still on the mold surface by pressure means or even by means of a suction couch roll to further dewater the formed web is not here classified, being rather in subclass 208. To be here classified the slurry must be in such condition, when con-

tacted by both mold surfaces, that the fibers are still in suspension and felting occurs on both mold faces.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

208+, and see (1) Note above.

300+, for paper making apparatus having plural molds.

204 This subclass is indented under subclass 202. Processes in which an interfelted fibrous web is subjected to a treatment step after removal from the mold surface on which it was formed either before or after final drying.

(1) Note. Included in this and the indented subclasses are various treatments, per se, of a completely formed web not provided for in other classes. For example, calendering, per se, of dry paper may be found in subclass 205.

(2) Note. Various subsequent treatments are set out in subclasses above and search must be made in those subclasses for the specific treatment. Thus by way of example search must be made in subclass 109 for after treatments which result in the formation of a non-uniform irregular or configured web or sheet, subclass 135 for processes of coating paper after drying, subclass 192 for processes involving electrical or wave energy treatment, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

109+, 135+ and 192, and see (2) Note above.
305, and 361+, for apparatus for subsequently treating a formed paper web.

SEARCH CLASS:

29, Metal Working, subclasses 90.1+ for processes for burnishing dry paper.

205 This subclass is indented under subclass 204. Processes in which the fibrous web is subjected to mechanical pressure by solid surfaces.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

117, for processes involving subsequent treatment of paper by an irregular or configured die.

305, and 361+, for apparatus for treating paper with solid press means.

206 This subclass is indented under subclass 205. Processes combined with a step of altering the temperature of the treated web.

207 This subclass is indented under subclass 204. Processes in which the subsequent treatment is that of altering the temperature of the formed web and/or directing a treating gas or vapor into association with the web.

(1) Note. Mere delivery of the web into the ambient atmosphere is not considered to be gas or vapor contact for this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

224+, for processes for heating discrete articles.

290, for paper making apparatus including heat exchange means.

SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses for drying, per se, of fibrous webs, and see especially subclass 23 of that class for gas and vapor treatment of sheets, web or strands.

208 This subclass is indented under subclass 202. Processes in which the slurry on the foraminous mold surface is subjected to a treatment in addition to the mere expression of liquid from the slurry.

(1) Note. In this and the indented subclasses may be found, for example, processes in which the slurry is vibrated to facilitate felting, subjected to pressure to aid dewatering, compacted, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

110, for processes producing a water-marked paper.

186, for processes for applying a nonfibrous additive to the slurry on a mold surface.

308, for apparatus having means to treat the slurry on the mold surface.

- 209** This subclass is indented under subclass 208. Processes in which the slurry is subjected to shaking, the action of a reciprocating member, or some other agitating influence.
- (1) Note. The agitation is usually for the purpose of aiding interfelting of the fibers in the slurry.
- 210** This subclass is indented under subclass 208. Processes in which the slurry is subjected to pressure by means of a solid member acting thereon.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 109+, for solid means acting on the slurry on the mold surface to produce an irregular web.
 312+, for apparatus having a solid member treating the slurry on the mold surface.
- 211** This subclass is indented under subclass 202. Processes for forming an endless web by draining the suspending medium through a foraminous mold and controlling the rate of drainage of the medium.
- (1) Note. Mere regular application of suction is not sufficient for classification in this subclass. See subclass 217 below for such subject matter.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 217, and see (1) Note above.
 351, for apparatus having means retarding or controlling drainage.
- 212** This subclass is indented under subclass 202. Processes including a step of bringing the pulp slurry into direct contact with a foraminous molding surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 315, for paper making apparatus having means directing the pulp slurry into contact with the mold surface.
- 213** This subclass is indented under subclass 212. Processes in which the pulp slurry is sprayed or directed against the mold surface in a stream while completely unsupported by confining means.
- (1) Note. The slurry may fall freely by gravity on the mold surface or may be projected under pressure but it is not channelized by head box or other similar structures.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 292, for apparatus in which the slurry is flung or projected against the mold surface.
- 214** This subclass is indented under subclass 212. Processes in which the slurry is applied to the mold surface under pressure greater than the normal hydrostatic head of the slurry on the mold surface.
- (1) Note. The increased pressure is usually achieved by utilizing a seal or gland between the mold and the stock supply conduit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 317, for pressure forming apparatus.
- 215** This subclass is indented under subclass 212. Processes in which the slurry is applied to a traveling mold and is directed in a direction differing for the direction of travel of the mold.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 324, 325 and 336+, for apparatus in which the stock is applied in directions other than the direction of travel of a moving mold.
- 216** This subclass is indented under subclass 212. Processes in which the slurry is subjected to a mechanical treatment directly before application to the mold surface.
- (1) Note. In this subclass may be found, for example, processes for rectifying the stock in the head box or subjecting it to

mechanical vibration just before application to the mold.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 208, for processes for treating the stock on the mold surface.
- 341, for apparatus for treating the slurry in the head box or approach flow channel.

217 This subclass is indented under subclass 202. Processes in which is recited a step of applying reduced pressure to the side of the foraminous mold to aid drawing the suspending medium through the pores of the mold.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 297, for apparatus applying suction directly to the slurry on the mold.
- 335, and 354+, for porous molds combined with suction means.
- 363+, for suction devices, per se, adapted for use in making paper.

218 This subclass is indented under subclass 100. Processes involving depositing fibers on a surface so as to form a product of definite and limited dimensions and shape as distinguished from a web of a definite length.

- (1) Note. This and indented subclasses relate to forming articles by "pulp molding".
- (2) Note. Processes of this group of subclasses usually result in an article having a nonplanar configuration, but this is not necessary.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 109+, for processes of forming webs or sheets which are irregular in configuration, but which irregularity is not such as to destroy its essentially flat condition.
- 231, for articles, produced by a process classifiable in this or indented subclasses (218+) and not provided for elsewhere.
- 382+, for apparatus for carrying out the processes of this group of subclasses.

219 This subclass is indented under subclass 218. Processes in which fibers are deposited from suspensions thereof at a plurality of different times or locations.

- (1) Note. One of the component layers or units of the product may have been previously produced by a waterlaying operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 103+, for processes of producing a composite web, sheet or article, which includes at least one solid nonwater-laid component.
- 123+, for processes of making composite webs or sheets from a plurality of waterlaid webs or sheets.

220 This subclass is indented under subclass 218. Processes in which a flexible diaphragm is brought into contact with the deposited fibrous material at some stage of formation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 401+, for pulp molding apparatus provided with a flexible diaphragm.

221 This subclass is indented under subclass 218. Processes including a treatment of a pulp molded article after removal from the forming means.

222 This subclass is indented under subclass 221. Processes including a step of altering the surface character of at least a portion of the article.

- (1) Note. The surface treatment of this subclass is to be distinguished from the subject matter of subclass 223, which involves a substantial change in the overall configuration of the article. Such treatments as smoothing and elimination of mold parting lines and other mold configurations are among the surface treatments provided for in this subclass (222).

- 223** This subclass is indented under subclass 221. Processes including changing the shape or configuration imparted to the article by the original forming means, after removal therefrom.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 117, for processes of treating a web with an irregular or configured die.
- 224+, for the treatment of a pulp molded article which does not change its general configuration but merely densities or decreases its thickness.
- 224** This subclass is indented under subclass 221. Processes including the application of heat and/or mechanical pressure to the article after removal from its original forming means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 223, for processes in which the pressure causes a change in overall configuration (other than mere decrease in thickness) of the article.
- SEE OR SEARCH CLASS:
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes under the class definition, for shaping or molding which may involve reshaping of a rewetted fibrous article.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for shaping a dry paper article by means of dies, and see the notes to the class definition thereof.
- 225** This subclass is indented under subclass 224. Processes resulting in a product which is rectangular in a cross-section through its thickness.
- (1) Note. Many of the patents in this subclass involve the simultaneous treatment of a plurality of boards or sheets.
- 226** This subclass is indented under subclass 218. Processes which include a step of applying heat to fibrous material after waterlaying, but while it is still in contact with a forming surface.
- 227** This subclass is indented under subclass 218. Processes which include a step of applying mechanical pressure to fibrous material, while it is still in contact with a forming surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 220, for processes wherein the pressure is applied by means of a flexible diaphragm.
- 228** This subclass is indented under subclass 218. Processes in which a bulk supply of pulp suspension is brought into association with a forming means, the fibrous material being deposited on the surface thereof as by withdrawal of the suspending water, followed by the separation of the excess pulp from the forming means with the deposited fibrous material thereon.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 387+, for corresponding apparatus.
- 229** This subclass is indented under subclass 228. Processes including a step of vibrating the forming means, or the pulp slurry while it is in contact with the forming surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 380, and 385, for apparatus which includes means for effecting vibration of a slurry in a container.
- 230** This subclass is indented under subclass 218. Processes which include a step of separating the deposited fibrous article from its forming surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 410, for apparatus for ejecting or removing a deposited fibrous article therefrom.
- 231** This subclass is indented under subclass 100. Products which are deposited fibrous articles having some significant structural shape or characteristic other than a web or sheet.
- (1) Note. The significant characteristic may be surface texture or configuration. This

subclass does not include articles of manufacture having structure which is classifiable in some class providing for that structure, even though it be made of deposited fibrous material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109+, for nonuniform, irregular or configured sheets or webs.

SEE OR SEARCH CLASS:

181, Acoustics, subclass 169, for fibrous material acoustical diaphragms.

232 This subclass is indented under the class definition. Apparatus relating to structures or mechanisms for producing and/or treating water or liquid laid fibrous products and various combinations of such structures with other structures or devices not elsewhere provided for and subcombinations, per se, not elsewhere provided for.

- (1) Note. See the class definition of this class (Class 162) for the locus of other and similar apparatus for use in making and/or treating waterlaid fibrous webs and articles.

233 This subclass is indented under subclass 232. Apparatus comprising means for bringing and/or maintaining fiber containing stock material in intimate association with a chemical treating fluid for the purpose of at least partially liberating discrete fibers by destroying nonfibrous bonding material in the stock.

- (1) Note. To be classified in this and the indented subclasses, the structures must include more than a mere container in which the reaction occurs. Thus, containers or receptacles of general utility, or having no structure limiting the device to a digester and various subcombinations of general utility are classified in other classes as set forth below under "SEARCH CLASS". The presence of means introducing a treating fluid into the digester structure is sufficient structure for classification in this class (Class 162).

SEE OR SEARCH CLASS:

- 52, Static Structures (e.g., Buildings), appropriate subclasses for a residual in situ erected type material container, particularly subclass 192, 223.1+, 245+, 250+, and 261+.
- 220, Receptacles, appropriate subclasses for metallic receptacles with or without closure members and see the class definition of that class for the locus of analogous structures.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 285 and 307 for cookers and digesters other than those used for liberating or treating fibers.

234 This subclass is indented under subclass 233. Apparatus combined with means to physically disrupt the bond material causing adherence of fibers one to the other.

- (1) Note. The defibering means may act on the pulp stock before, during or after digestion.
- (2) Note. Apparatus for exploding or for impinging the material after digestion against a target is not considered to be mechanical defibering means for this subclass. For the locust of such devices see the search note below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 247, for devices in which defibering occurs by explosion or impingement of the material against a target after digestion.
- 261, for defibering means combined with paper making apparatus other than digesters.

SEE OR SEARCH CLASS:

- 241, Solid Material Comminution or Disintegration, appropriate subclasses for defibering means, per se.

235 This subclass is indented under subclass 234. Combinations in which the digester and defiberator operate on the material simultaneously and under the same conditions of temperature and pressure.

- (1) Note. The defiberating means in this combination may operate only part of the time.
- 236** This subclass is indented under subclass 235. Apparatus in which the stock material is fed to and discharged from a digester and defiberating apparatus at substantially the same rate, whereby a more or less steady flow of material is maintained.
- 237** This subclass is indented under subclass 233. Devices provided with means to charge and discharge the digester at substantially the same rate, whereby a more or less steady flow of material is maintained through the treating device.
- (1) Note. The devices of this subclass may be operated intermittently or with separate batches just so long as the material is fed in and discharged from the apparatus at approximately the same rate and during the same time.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
17+, for processes for continuous digestion.
- 238** This subclass is indented under subclass 233. Apparatus having means sensing a condition in the material undergoing treatment or in the treating fluid or chemical and in response thereto causing a control operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
252+, for apparatus other than digestion devices having automatic control features and see the Notes thereto for the locus of other apparatus having automatic control features.
- 239** This subclass is indented under subclass 233. Apparatus provided with means to salvage or make available for reuse heat and/or products resulting from the digestion process.
- (1) Note. In this subclass may be found, for example, apparatus in which materials salvaged include chemicals used to liberate or free the fibrous materials, or in which means are provided to utilize excess thermal energy that would otherwise be lost in the digestion process.
- (2) Note. Mere recirculation of digestion materials through the same batch of material to be treated is not classified in the indented subclasses. For such subject matter search subclass 248 below. Also, the recovery of used liquor or heat by passing it directly into another digester containing chips to be digested is not included here. For such subject matter see subclass 241 below and the Notes thereto.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
29, for processes including a step of recovering the digestion fluid, and subclass 47 for digestion processes including a heat recovery step.
241, and see (2) Note, above.
248, and see (2) Note, above.
- 240** This subclass is indented under subclass 239. Apparatus having means to apply heat to the used chemicals to cause a change in the state or nature of the chemicals to render them fit for reuse.
- 241** This subclass is indented under subclass 233. Apparatus having two or more digesters in operational association.
- (1) Note. Patents disclosing plural completely independent digesters are not classified in this subclass. To be here classified the patents must recite some structural interrelationship or interdependency. For example, in this subclass may be found digesters with connections so that cooking gas or liquor may be passed directly from one into the other.
- (2) Note. Multiple digesters arranged so that the material to be treated flows serially from one to the other are not provided for in this subclass. For such subject matter see subclasses 243 and 246.

- 242** This subclass is indented under subclass 233. Apparatus having means combined with or in addition to digester structures which means either perfects the operation of the digester or performs some function other than digestion.
- 243** This subclass is indented under subclass 233. Apparatus having means to maintain the stock material undergoing digestion in a state of motion.
- (1) Note. The circulation is usually for the purpose of insuring intimate contact of the material with the chemical treating agent.
 - (2) Note. This subclass includes forced circulation of the material being digested, but does not include mere forced circulation of the digestion fluid through the material being digested. For the latter subject matter see subclass 248 below.
 - (3) Note. This subclass does not include circulation caused by heating alone. For such subject matter see subclass 250 below.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 234+, for apparatus in which the circulating means causes substantial defibering of the stock material.
 248, and see (2) Note above.
 250, and see (3) Note above.
- 244** This subclass is indented under subclass 243. Apparatus in which the agitation is caused by motion of the digester structure about an axis of rotation.
- (1) Note. Mere tilting of the digester for discharge is not included in this subclass. For such subject matter search subclass 246.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 246, and see (1) Note above.
- 245** This subclass is indented under subclass 233. Apparatus having means separable from the digester for either (1) containing a charge of material undergoing treatment or (2) constraining a charge from movement within the digester.
- 246** This subclass is indented under subclass 233. Apparatus in which the body of the digester structure is provided with means to permit the introduction of the stock material to be digested, or the delivery of the material after treatment within the digester.
- (1) Note. This subclass does not provide for mere means to permit recirculation of either material treated or the chemical treated material even though the material may be removed bodily from the digester. For such subject matter search subclass 248 below.
 - (2) Note. The mere provision of an inlet opening in the digester structure either with or without a closure member is not sufficient to classify the patent in this subclass where the patent in the absence of such opening would be classified elsewhere. Patents claiming this subject matter in the absence of other features classifiable here may be found in classes relating to vessels of general utility, such as Class 220, Receptacles, for example.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 52, for digestion processes including a step of charging and/or discharging the fibrous material.
 236, and 237, for means for charging and discharging continuous digesters.
 239+, for discharging means combination with recovery means.
 241, for digesters having means for discharging material into another digester.
 248, and see (1) Note above.
- SEE OR SEARCH CLASS:
 220, Receptacles, particularly subclasses 200+ and see (2) Note above.
- 247** This subclass is indented under subclass 246. Apparatus in which the stock material is treated by (1) projecting it violently from the digester against a fixed abutment or (2) the material is

- caused to disintegrate by suddenly releasing the digestion pressures.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
21+, for digestion processes including a step of defibering by projection or explosion.
- SEE OR SEARCH CLASS:
99, Foods and Beverage: Apparatus, subclasses 323.4+ see the Notes thereto for other apparatus for expanding or disintegrating material by a sudden release in pressure.
- 248** This subclass is indented under subclass 233. Apparatus having means to positively force the flow of digestion chemicals through the material being treated.
- (1) Note. The material is usually forced through a separate conduit, which conduit may be entirely in the digester or may be outside of the digester proper.
- (2) Note. This subclass does not provide for circulation of the treating chemical or stock material within the digester by heating means alone where the circulation is not through the separate conduit or orifice such as, for example circulation caused by the introduction of steam alone. For such subject matter search subclass 250 below.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
243+, for apparatus in which the circulation is caused by mechanical stirring of the contents of the digester.
250, and see (2) Note above.
- 249** This subclass is indented under subclass 248. Apparatus having means to either maintain or cause a rise in temperature in either stock undergoing treatment or the treating chemical.
- (1) Note. The heating means may be in the circulating circuit or in the digester.
- 250** This subclass is indented under subclass 233. Apparatus provided with means to cause a rise in temperature of either the stock material or the chemical treating fluid.
- (1) Note. Included in this subclass may be found for example, means discharging or introducing fluids through a heating steam line.
- 251** This subclass is indented under subclass 233. Apparatus having a foraminous screen at an outlet of the digester to retain stock material and permit the passage of fluid therethrough.
- SEE OR SEARCH CLASS:
55, Gas Separation, subclasses 505+ for flow line end coupled filter units and subclasses 301+ for cohesive filter media cleaning means.
- 252** This subclass is indented under subclass 232. Apparatus having means to sense a condition and in response thereto cause a control operation of the apparatus.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
238, for digestion apparatus having automatic control features.
- 253** This subclass is indented under subclass 252. Apparatus in which the control is of more than a single device.
- 254** This subclass is indented under subclass 252. Apparatus in which the control is of a means preparing the stock for the forming operation.
- (1) Note. In this subclass may be found, for example, devices to sense the consistency of the stock and in response thereto control a refining device to vary the characteristics of the stock.
- SEE OR SEARCH CLASS:
241, Solid Material Comminution or Disintegration, subclasses 33+ for fibrous material comminutors having automatic control features.

- 255** This subclass is indented under subclass 252. Apparatus in which the sensing means determines the continuity of the fibrous web or in which the control means causes the actuation of a device intercepting a rupture in the formed web and maintains continuity thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
193, for processes for forming and/or guiding the initial strip of web to be trained through the web forming or treating machine.
- 256** This subclass is indented under subclass 252. Apparatus in which the control means affects the rate of speed or direction of motion of a moving foraminous forming surface.
- 257** This subclass is indented under subclass 256. Apparatus in which the controlled motion of the foraminous forming surface is in a plane normal to the length of the surface.
- (1) Note. In this subclass may be found, for example, devices for either causing or preventing lateral shift of a traveling Fourdrinier wire.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
355, for Fourdrinier devices having means transversely vibrating the wire in which no automatic control devices are present.
- SEE OR SEARCH CLASS:
474, Endless Belt Power Transmission Systems or Components, subclasses 101+, and in particular subclasses 102+ for mechanism in which the invention relates to devices for maintaining a flexible band in predetermined paths of travel. This class (162) provides for devices in which positive cyclical shifting motion is imparted to a forming belt to prevent wear on the surface over which it slides, and in addition to control the tracking of the forming belt.
- 258** This subclass is indented under subclass 252. Apparatus in which the control device regulates the ratio of liquid to fibers of the pulp.
- SEE OR SEARCH CLASS:
137, Fluid Handling, appropriate subclasses and, subclass 91 and 92 in particular, for consistency control devices, per se.
- 259** This subclass is indented under subclass 252. Apparatus in which the device controlled directs the stock onto the forming device.
- (1) Note. In this subclass may be found, for example, devices for sensing the thickness of the formed web and in response thereto regulating the amount of stock applied to the wire.
- 260** This subclass is indented under subclass 252. Apparatus in which the device controlled severs at least a portion of a shaped article.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
286, for other cutting devices not having automatic control features.
- 261** This subclass is indented under subclass 232. Apparatus having means subjecting the stock material to an attrition step.
- SEE OR SEARCH CLASS:
241, Solid Material Comminution or Disintegration, appropriate subclasses for apparatus for performing an attrition step on fibrous material when not in combination with a chemical treatment.
- 262** This subclass is indented under subclass 232. Apparatus having electrical means for causing or controlling a paper making operation that consists of more than mere power or motive means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
252+, for automatic controls which may or may not utilize electrical systems in the control operation.

- 263** This subclass is indented under subclass 232. Apparatus having means (1) to detect some condition in the operation of the machine, the detecting means operating a visual and/or audible indication of the condition, (2) or to indicate or test a physical or chemical condition of the material under treatment, (3) or means permitting or peculiarly adapted to permit examination of the machine or the material undergoing treatment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 49, for processes involving a step of testing, sampling or analyzing.
252+, for means detecting a condition and in response thereto causing a control operation.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 99 for presses having measuring, inspecting or testing means and see the search notes thereto for the locus of other art relating to these features.
340, Communications: Electrical, subclasses 500+ for electrical automatic condition responsive indicating systems.

- 264** This subclass is indented under subclass 232. Apparatus including means (1) to enable reuse of the pulp slurry fluid after drainage through the forming surface during the web forming step, with or without means to subject the fines carrying fluid to a reclaiming treatment, (2) or means to collect or make available for reuse the freshly formed web at some point before final drying.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 4, for liberation processes including a step of utilizing as stock material waste paper and textile waste.
147, for processes and products utilizing plural fibers at least one of which is waste paper or textile waste.
189+, for other processes including the use of white water or waste material.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 174 for press rolls including a deflector adjacent the outgoing side of the roll body which deflector is so mounted as to direct the pressed material away from the surface of the roll body.

- 265** This subclass is indented under subclass 232. Apparatus combined with means applying a surface film and/or absorbed layer of material other than a fibrous water-laid substance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 134, for processes of forming a waterlaid product including a step of printing or applying a variegated coating.
135, for processes including a step of applying a coating after drying of the product.
158+, for processes including a step of applying a nonfiber additive to a fibrous product at an intermediate stage of its manufacture.
267, for apparatus for molding waterlaid fibrous material about or in contact with a nonfibrous body or material.
298, and 300, for apparatus for producing a composite web of waterlaid fibrous material.

SEE OR SEARCH CLASS:

- 118, Coating Apparatus, appropriate subclasses including apparatus for coating devices, per se.

- 266** This subclass is indented under subclass 265. Apparatus in which the coating material is applied to the product while still on the foraminous forming surface.

- 267** This subclass is indented under subclass 232. Apparatus in which the fibrous slurry product is formed in contact with or about a shaped body or member, which member is not waterlaid and becomes a part of the finished article or product.

- (1) Note. In this and the indented subclasses may be found, for example devices for making insulated wire by applying a

- fibrous waterlaid material about a wire core.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
298, and 300, for apparatus for forming composite waterlaid webs.
- 268** This subclass is indented under subclass 267. Apparatus in which the molded pulp article is of very great length relative to its width or cross-section.
- 269** This subclass is indented under subclass 232. Apparatus combined with means arranging the molded pulp articles in superposed relationship, or in adjacent face-to-face juxtaposition.
- SEE OR SEARCH CLASS:
271, Sheet Feeding or Delivering, appropriate subclasses for sheet handling devices, per se, and see the Notes thereto for the locus of other art similar thereto.
- 270** This subclass is indented under subclass 232. Apparatus for treating a dried article having means for either (1) temporarily distorting the article within its elastic limits, or (2) returning a deformed or distorted article to its normal planar configuration.
- (1) Note. In this subclass may be found, for example, devices for decurling photos:graphic prints, for "breaking" the coatings on flexible webs, or for flattening folded or creased computer cards.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
197, for processes there provided for involving a step of stretching, tensioning, decurling, flexing or breaking.
286, for paper making apparatus combined with means for trimming, scoring, cutting, severing or perforating the produced product.
- SEE OR SEARCH CLASS:
38, Textiles: Ironing or Smoothing, appropriate subclasses, for devices for ironing or smoothing textile materials.
- 271** This subclass is indented under subclass 270. Apparatus in which the material undergoing treatment is in the nature of a sheet or web.
- 272** This subclass is indented under subclass 232. Apparatus having means to prepare the apparatus for the paper making operation or place it in better condition to perform its function or to remove superfluous and undesirable residue of the paper making operation from the structure.
- (1) Note. This subclass includes modifications of the paper making machine structure whereby parts may be more readily interchanged or removed from the machine. For example, in this subclass and the indented subclasses may be found paper making devices modified to permit replacement of the Fourdrinier wire or means mounting the suction boxes for ready removal and/or replacement. Also in this and the indented subclasses may be found devices for cleaning or renewing the foraminous or porous felts or screens.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
199, for processes involving a step of conditioning, preparing or repairing the apparatus.
- SEE OR SEARCH CLASS:
29, Metal Working, subclasses 402.01+, for processes of repair generally and see especially the notes thereto for the locus of other art relating to repair.
- 273** This subclass is indented under subclass 272. Apparatus in which the apparatus is structurally modified to permit removal and substitution of the foraminous forming surface or in which means are provided to maintain the proper degree of tension on an endless foraminous forming member.
- SEE OR SEARCH CLASS:
474, Endless Belt Power Transmission Systems or Components, particularly subclasses 101+ for means for adjusting belt tension.

- 274** This subclass is indented under subclass 272. Apparatus in which the part of the apparatus undergoing treatment is pervious and permits the passage of fluid therethrough.
- (1) Note. In this subclass, for example, may be found devices in which a fibrous brush cleans the porous or foraminous member.
- SEE OR SEARCH CLASS:
 68, Textiles: Fluid Treating Apparatus, appropriate subclasses, and see especially the Notes thereto for the locus of other art relation to the cleaning of fabric articles.
 198, Conveyors: Power Driven, subclasses 494+ for a conveyor having installed as part of its structure a means for cleaning a component of the conveyor.
 210, Liquid Purification or Separation, subclasses 391+ for filter cleaning devices.
- 275** This subclass is indented under subclass 274. Apparatus in which the cleaning or conditioning medium is a liquid.
- SEE OR SEARCH CLASS:
 209, Classifying Separating, and Assorting Solids, subclass 380 for fluid jet screen cleaning devices.
- 276** This subclass is indented under subclass 275. Apparatus in which the member being treated rotates about an axis and is circular in transverse section, the center of the circular section coinciding with the axis of rotation.
- 277** This subclass is indented under subclass 275. Apparatus in which the means supplying the liquid translates with respect to the member being cleaned or conditioned.
- 278** This subclass is indented under subclass 277. Apparatus having in addition to the means supplying the liquid a source of reduced pressure acting on the surface to be treated.
- 279** This subclass is indented under subclass 275. Apparatus having in addition to the means supplying the liquid a source of reduced pressure acting on the surface to be treated.
- 280** This subclass is indented under subclass 232. Apparatus specifically or peculiarly adapted to produce an endless product that is bodily wrinkled in character.
- (1) Note. The product is usually produced, for example, by crowding the moist paper on itself to induce it to wrinkle.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 111+, for processes for producing a creped or crinkled product.
- SEE OR SEARCH CLASS:
 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 369 for apparatus including an endless surface for corrugating a nonmetal sheet (e.g., paper, etc.), and subclass 391 for a preform convoluting or twisting means not otherwise provided for.
- 281** This subclass is indented under subclass 280. Apparatus in which a solid scraping means removes a web product from the circumference of a drum which scraping means causes crowding of the material on itself.
- 282** This subclass is indented under subclass 281. Apparatus in which the cylinder is provided with continuous recesses extending around its outer surface in planes normal to the axis of the cylinder.
- (1) Note. The circumferential grooves may be for the purpose of additionally longitudinally corrugating the product.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 296, for pulp web forming devices having a corrugated surface with no additional creping feature.

- 283** This subclass is indented under subclass 232. Apparatus combined with means to lay the product in turns about a mandrel or core.
- (1) Note. The winding device may function to form a tube-like article or may merely be for the purpose of winding a finished web on a roll for storage or transport.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
118+, for processes including a step of winding or roll forming.
- SEE OR SEARCH CLASS:
242, Winding, Tensioning, or Guiding, subclasses 520+ for convolute winding.
- 284** This subclass is indented under subclass 283. Apparatus specially adapted or peculiar to forming a hollow cylindrical body.
- 285** This subclass is indented under subclass 284. Apparatus provided with means for severing the formed tubular body.
- (1) Note. The severing may be for the purpose of trimming the tube or slitting the tube so that it may be opened up and discrete sheets formed therefrom.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
120, for processes of roll forming involving a step of cutting and/or removing material.
- 286** This subclass is indented under subclass 232. Apparatus combined with (1) means causing separation of a unitary portion of a web or article into separate parts, (2) means forming holes by piercing or perforating means or (3) means incising or scratching the surface of a pulp body.
- (1) Note. The combined means may be either a solid instrument or a fluid jet.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
109+, for processes involving a step of making a nonuniform, irregular or configured web or sheet, and see especially subclass 114 for perforating processes.
- 193, for processes involving the formation of a lead strip.
- 194+, for forming processes combined with a step of cutting or slitting.
- SEE OR SEARCH CLASS:
83, Cutting, appropriate subclasses, for apparatus for cutting and slitting when not combined with a paper-making step.
- 287** This subclass is indented under subclass 232. Apparatus combined with means distorting a single workpiece to bring separate areas of the workpiece into face-to-face relationship or distorting the workpiece into a grossly altered configuration.
- (1) Note. In this subclass may be found for example, devices for twisting or rolling a web to form a strand of roving, or devices for forming a folded shaped article.
- (2) Note. The art in subclass 270 differs from the art herein in that the distortion in the instant subclass is permanent, the material is distorted beyond its elastic limits, whereas in subclass 270 the distortion is transitory or temporary.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
270, and see (2) Note above.
- SEE OR SEARCH CLASS:
270, Sheet-Material Associating or Folding, subclass 61 for folders, per se.
493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, for making an article of commerce from sheet or web material such as paper involving folding where there is no thickening or thinning flow of the material. Note that shaping of wet or damp paper usually involves thinning or thickening flow.

288 This subclass is indented under subclass 232. Apparatus having means to form a waterlaid felted product combined with a solid work piece treating member acting on the work piece after formation which solid member contacts the surface of the work piece under pressure and has a motion relative to the surface of the work piece to modify at least the surface characteristics of the work piece.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 305, for combinations of molding devices with separate pressing means where no rubbing is involved.
- 358, for pressing devices including a porous or foraminous carrier to carry the pressed web through the pressing instrumentality.
- 359, for the combination of separate pressing and drying devices.

SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 90.01+ for burnishing, per se, and especially subclasses 90.1+ for the burnishing of paper.

289 This subclass is indented under subclass 232. Apparatus specifically adapted or peculiar to the handling of work of great length relative to its cross-section which work is continually produced or treated.

- (1) Note. In this and the indented subclasses may be found, for example, devices for producing from a slurry endless webs of paper, endless tubes of fiber containing material and also means specialized to this class for treating such products after initial forming on a foraminous forming surface whether or not the forming device is claimed.
- (2) Note. For devices producing discrete articles search must be made in subclass 375 or the subclasses following it in the schedule.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 202+, for running or indefinite length work forming and/or treating processes.

290 This subclass is indented under subclass 289. Apparatus having foraminous forming means and including in combination therewith means to alter the temperature of the formed article.

- (1) Note. In this subclass may be found, for example, the combination of web forming means and separate web drying means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 121, for processes for winding or roll forming including a step of heating the article.
- 135+, for processes involving a step of coating a product after drying.
- 192, for processes involving the application of electrical or wave energy to the product, which energy may heat the product.
- 206, and 207, for processes for the subsequent treatment of a formed web including the step of heating or cooling the formed web.
- 224+, and 226, for article heating processes.
- 359, for the combination of a press and felt with separate heated drying means.
- 375+, for apparatus including heating means for discrete articles as distinguished from endless webs of the instant subclass.

SEE OR SEARCH CLASS:

- 34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses, for drying, per se, of formed pulp articles and especially subclasses 110+ for external drum type driers and subclasses 611+ for devices for drying sheet, web or strand form work.
- 100, Presses, subclasses 300+ for heated presses, per se.

291 This subclass is indented under subclass 289. Apparatus in which the fibrous pulp material is brought into contact with a foraminous forming surface by a solid nonporous transfer member which separates a film of pulp from the bulk supply and carries it into contact with the mold surface.

- (1) Note. In this subclass may be found, for example, apparatus in which an impermeable cylinder is immersed in the pulp supply and in rotating carries on its surface a film of the pulp in a manner of an applicator and applies it to the surface of the endless foraminous mold.
- 292** This subclass is indented under subclass 289. Apparatus in which the stock material is sprayed or directed in a stream against the foraminous molding surface while completely unsupported or unconfined.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
213, for processes for projecting or sling-
ing the stock against a mold surface.
- 293** This subclass is indented under subclass 289. Apparatus in which an endless molded product is formed on a molding surface of a limited length.
- (1) Note. In this subclass may be found, for example, apparatus for producing an endless waterlaid tube of pulp material on a short foraminous core through which the carrier fluid is removed from the pulp, the endless tube as it is formed being continuously removed from the core.
- (2) Note. The means of this subclass are in some respects analogous to the continuous casting devices of Class 164, Metal Founding, the plastic metal shaping devices of Class 72, Metal Deforming, subclasses 253.1+, and Class 425, Plastic Article or Earthenware Shaping or Treating: Apparatus.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclasses 253.1+ and see (2) Note Above.
164, Metal Founding, subclasses 273+ for continuous casting devices and see (2) Note above.
425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 376.1+ for extrusion shaping apparatus for nonmetals not otherwise
- provided for; see the search notes thereunder.
- 294** This subclass is indented under subclass 289. Apparatus in which the pulp supply container and the mold have a stop-and-go motion relative to one another whereby an endless article is formed in stepwise fashion.
- 295** This subclass is indented under subclass 289. Apparatus in which the face of an endless foraminous forming surface is curved either transversely or longitudinally of the direction of motion, the low point of the curvature being on the stock carrying face.
- (1) Note. In this subclass may be found, for example, forming devices having an endless screen which screen is bowed transversely of its length to assume a trough-like configuration, perhaps to retain the material on the screen, or also, for example, endless screens that slump or form a curve between the entrance point of the stock and the web take off point.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclass 501 and 818+ for an endless belt conveyor trough-shaped in cross section.
- 296** This subclass is indented under subclass 289. Apparatus in which the foraminous molding face presents a grossly interrupted or broken surface or carries a design or pattern on its face, whereby a nonplanar surfaced product is produced.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
109+, for processes for producing nonuniform, irregular or configured sheets and webs and especially subclass 116 for such processes utilizing a configured forming mold.
- 297** This subclass is indented under subclass 289. Apparatus in which means are provided for either increasing or decreasing the pressure of the atmosphere immediately contacting the surface of the pulp on the mold.

- (1) Note. Excluded from this subclass are devices which draw a vacuum through the mold surface and thus act indirectly on the stock on the mold. For such subject matter see the various subclasses provided for below. In the instant subclass the action is directly on the stock and not through the pervious mold surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 208, for processes for treating the slurry on the mold surface.
 308+, for other apparatus for treating stock on the molding surface.
 335, 351 and 363+, and see (1) Note above.
- 298** This subclass is indented under subclass 289. Apparatus in which more than a single means directs the pulp into the immediate contact with the forming surface.
- (1) Note. The separate streams of this subclass are in fact discrete applying means as distinguished from a vaned single applying means. For a single flow bow or applying means having vanes or streams splitting means search subclass 343 below.
- (2) Note. The separate streams may be positioned either transversely of the direction of motion of the molding surface or longitudinally thereof.
- 299** This subclass is indented under subclass 298. Apparatus in which the foraminous molding surface is endless and travels longitudinally of itself and the plural separate streams of stock applied at spaced positions along the length of the foraminous molding surface.
- (1) Note. In this subclass may be found, for example, devices for making endless multilayer webs by depositing stock from separate sources on previously formed webs on a common carrier.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 123+, for processes for the production of plural layered webs.
- 300** This subclass is indented under subclass 289. Apparatus having plural discrete foraminous molds and/or discrete separated portions of a single mold against which stock is applied.
- (1) Note. In this and the indented subclasses either separate web products may be produced or the plural molds may coact to produce a single ultimate web.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 123+, for processes producing multilayer waterlaid webs or sheets.
 203, for processes producing a single web between opposed forming surfaces.
- 301** This subclass is indented under subclass 300. Apparatus in which a single source of supply directs the pulp against the molding surfaces.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 312, for molds having means treating the stock on the mold surface which means may be in the form of an endless foraminous belt. In the instant subclass the stock must have fibers in suspension while in contact with the plural foraminous members whereby web formation occurs at the plural surfaces whereas in subclass 312, the product has been formed when contacted by the endless treating members.
- 302** This subclass is indented under subclass 301. Apparatus in which the plural molds each comprise a cylinder and in which the outer circumferential surface is foraminous and forms the molding surface, the foraminous surfaces being in touching contact or closely spaced one with the other to unite the accreted webs.
- 303** This subclass is indented under subclass 300. Apparatus in which the forming surfaces of separate molds approach a single point in their travel to bring together the separate webs formed on each mold surface.
- 304** This subclass is indented under subclass 300. Apparatus in which the separate webs produced on the molding surface are applied to a

moving additional surface in sequence so that they may be joined together to form a laminated product.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

133, for processes in which separately formed webs are united on a common carrier.

- 305** This subclass is indented under subclass 289. Apparatus having means for compressing the work after removal from the foraminous forming surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

205+, for processes for pressing a web after removal from the mold.

358, for press and felt combinations, per se.

SEE OR SEARCH CLASS:

100, Presses, appropriate subclasses for presses, per se, and see the Notes thereto for the locus of other press structures.

- 306** This subclass is indented under subclass 289. Apparatus having means to displace the formed body from the surface on which it is felted or layed.

- 307** This subclass is indented under subclass 306. Apparatus in which the means displacing is a fluid blast directed through the foraminous molding surface.

- 308** This subclass is indented under subclass 289. Apparatus having means positioned adjacent the foraminous forming surface and acting directly on the pulp material before it is removed therefrom.

- (1) Note. In this and the indented subclasses may be found devices which in some way modify the characteristics of the finished product by a physical action on the stock either while still in a state of suspension (note subclass 311) or after felting but while still on the mold, but in either case the action on the fibers must occur adjacent the mold surface while the fibers are in contact with the surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

208, for processes for the treatment of the slurry on the mold surface.

290, for the combination of a forming mold and separate drying means for the product after removal from the mold.

297, for apparatus in which pneumatic pressure or vacuum means act directly on the stock mold surface.

305, for the combination of a foraminous mold and means subjecting the product to pressure after removal from the mold.

- 309** This subclass is indented under subclass 308. Apparatus in which the means acting on the pulp (1) has a different affect on increments of the pulp in a direction transverse of the produced article, (2) acts in random manner on the pulp, or (3) is configured to impress a particular pattern on the pulp.

- (1) Note. In the indented subclasses may be found, for example, devices for embossing the pulp layer or imparting different surface characteristics to the layer which characteristics are not uniform.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

109+, for processes producing a nonuniform, irregular or configured web or sheet.

- 310** This subclass is indented under subclass 309. Apparatus in which the means comprises a fluid stream directed against the pulp layer, and/or a suction nozzle locally affecting the pulp layer.

- (1) Note. The instant devices all treat the product nonuniformly as distinguished from the devices in subclass 297 which apply fluid or treat with vacuum in uniform manner over the entire product on the mold.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

115, for processes producing a nonuniform sheet or web utilizing fluid pressure.

- 286, for trimming or cutting means utilizing a fluid jet.
297, and see (1) Note above.
- 311** This subclass is indented under subclass 308. Apparatus in which the treating means is positioned at the point where the stock stream initially contacts the foraminous forming surface.
- (1) Note. In this subclass may be found, for example, rectifier rolls positioned adjacent the molding surface. The position of the roll must be such that the fibrous material on the mold is modified in some way by the direct action thereon of the roll. In subclass 342 may be found rectifier rolls immersed in the stock in the head box and treating the fibers while in suspension and before felting on the mold.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
342, for head boxes having rectifier roll structures therein but not adjacent the molding surface and see (1) Note above.
- 312** This subclass is indented under subclass 308. Apparatus in which the treating means is a solid member as distinguished from a fluid current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
286, for paper making devices combined with means for severing the formed web which means may act on the pulp on the mold surface.
300+, and especially subclass 301 for plural opposed mold surface forming a web therebetween.
- 313** This subclass is indented under subclass 312. Apparatus in which the treating member is mounted for motion relative to the layer of pulp on the forming surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
209, for processes for treating slurry on a mold surface in which the treatment includes a step of vibration or agitation.
- 314** This subclass is indented under subclass 313. Apparatus in which the solid treating member has motion about an axis of rotation.
- (1) Note. In this subclass may be found, for example, "dandy" rolls acting on the pulp material on the mold.
- 315** This subclass is indented under subclass 289. Apparatus having means for bringing a pulp slurry into association with a foraminous mold whereby a fibrous body may be formed thereon.
- (1) Note. In this and the indented subclasses may be found either the subcombination of the stock directing means, per se, (note subclass 336, for example) or the directing means in operational association with the foraminous mold.
(2) Note. The directing means may be any instrumentality for either bringing the pulp slurry from the supply and into association with the mold or merely to maintain the slurry against the mold so that felting to form a product can occur. Thus even a claimed cylinder vat (subclass 323) is sufficient structure of a stock directing means for this subclass in that it maintains the stock against the mold.
- 316** This subclass is indented under subclass 315. Apparatus in which the mold surface is generally flat and horizontally disposed and the stock slurry contacts only the lower surface of the mold.
- 317** This subclass is indented under subclass 315. Apparatus in which the means directing the stock into contact with the forming surface is a closed conduit completely embracing the stock slurry and is in sealing contact with the foraminous forming surface.
- (1) Note. The devices of this subclass are known in the art as pressure forming devices and are for the purpose of increasing the pressure with which the stock is applied to the mold surface.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
214, for pressure forming processes.
- 318** This subclass is indented under subclass 315. Apparatus in which the foraminous molding surface comprises a permeable rotary body circular in section transverse to the axis of rotation having trained thereabout an endless foraminous flexible forming member longer in length than the circumference of the cylinder and at least a portion of which is spaced from the cylinder at a point removed from the slurry supply point.
- (1) Note. In these devices, the article is usually formed on the area where the endless belt is in contact with the forming cylinder and is then removed from the forming cylinder and carried down the endless belt away from the forming cylinder.
- 319** This subclass is indented under subclass 318. Apparatus in which the forming surface forms a restraining wall for the stock container or supports the bulk supply of pulp slurry from which the article is accreted.
- (1) Note. In the devices of this subclass the stock slurry supply container is an incomplete receptacle and one wall of the receptacle is formed by the forming surface. If the forming surface would be removed, the slurry would flow out of the receptacle.
- 320** This subclass is indented under subclass 315. Apparatus in which the forming surface forms a restraining wall for the stock container or supports the bulk supply of pulp slurry from which the article is accreted.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
319, and see (1) Note of that subclass.
- 321** This subclass is indented under subclass 320. Apparatus in which the mold is cylindrical in nature and the circumferential surface is foraminous.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
323+, for cylinder mold forming devices of the immersion vat type.
357, for cylinder molds, per se.
- 322** This subclass is indented under subclass 315. Apparatus having means for introducing material other than pulp slurry into the device directing the stock against the forming surface.
- (1) Note. In this subclass may be found, for example, devices for introducing water into the stock stream, or solid particles of nonfibrous material.
- 323** This subclass is indented under subclass 315. Apparatus having a complete container for the pulp slurry and in which the forming member dips into the pulp supply and while immersed therein accretes a layer of stock to form the article.
- (1) Note. The majority of the devices in this subclass have the conventional cylinder mold wherein both the forming cylinder and the immersion vat are recited in the claims.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
318+, for cylinder machine devices having a forming belt thereabout.
320+, for forming devices of the superposed or lateral stock pool type.
- 324** This subclass is indented under subclass 323. Apparatus in which the pulp slurry container has means therein for diverting the stock flow in opposite directions at will or wherein the supply of slurry to the vat is such that the direction of flow may be reversed at will.
- 325** This subclass is indented under subclass 323. Apparatus in which the pulp slurry is brought into contact with the foraminous forming surface and sweeps across the surface in a direction at right angles to the direction of motion of the surface.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 338, for slurry supply devices having a transversely crossed inlet into the flow box.
- 326** This subclass is indented under subclass 323. Apparatus in which the pulp slurry is caused to contact the mold surface at more than a single area on the mold.
- 327** This subclass is indented under subclass 323. Apparatus in which the immersion vat is provided with separate diverters in addition to the vat structure, per se, causing the stock slurry to flow into direct and intimate contact with the mold surface.
- (1) Note. Mere configuration of the vat whereby it approximates the shape of the mold is not sufficient to render the patent classifiable in this subclass.
- 328** This subclass is indented under subclass 327. Apparatus in which the baffle structure approximates the external configuration of the immersed cylinder mold.
- (1) Note. Mere vat bottoms contoured to approximate the circumference of the contained cylinder mold are not provided for in this subclass. To be here classified the baffle must be inserted into the vat with stock on opposite sides of the baffle in normal operation.
- 329** This subclass is indented under subclass 328. Apparatus in which the baffle structure is adjustable or in which the position of the baffle may be altered at will to increase or decrease the space between the baffle and the cylinder mold.
- 330** This subclass is indented under subclass 323. Apparatus provided with means to regulate the height of the pulp slurry contained within the immersion vat.
- 331** This subclass is indented under subclass 323. Apparatus having gland structures preventing leakage of the pulp slurry at the points of rotary support for the cylinder mold.
- SEE OR SEARCH CLASS:
 277, Seal for a Joint or Juncture, for a generic sealing means or process, subclasses 358+ for a relatively rotatable radially extending sealing face member (e.g., face, mechanical, etc.) or subclasses 500+ for a dynamic, circumferential, contact seal for other than a piston.
- 332** This subclass is indented under subclass 323. Apparatus relating to the mounting of the cylinder mold within the vat.
- 333** This subclass is indented under subclass 332. Apparatus wherein the rotatable cylinder mold is supported at its periphery rather than at the axis of rotation.
- 334** This subclass is indented under subclass 323. Apparatus provided with means to limit or control the area of contact or shield the contact of the pulp slurry with the foraminous molding surface.
- (1) Note. The devices in this subclass block mask off portions of the foraminous surface whereby no accretion occurs at these portions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 109, for processes producing a configured web or sheet.
 353, for endless wire molds and associated mask, deckle, or apron structure.
 383, for devices molding discrete articles and having masking means.
- 335** This subclass is indented under subclass 323. Apparatus provided with means to collect or guide the fluid material passing through the foraminous forming surface, either with or without suction means to impel the fluid material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 264, for apparatus for the recovery, recirculation or treatment of white water. "Recovery" entails more than mere collection of the fluid in that the mate-

- rial collected must be modified in some way.
- 363+, for suction systems and devices, per se, for use in paper making devices.
- 336** This subclass is indented under subclass 315. Apparatus in which the directing means (1) spreads slurry into a thin sheet for discharge onto the mold, (2) provides a hydrostatic or pressure head to give the slurry the requisite speed of discharge onto the mold, and/or (3) keeps the slurry sufficiently agitated to prevent flocculation before discharge onto the mold.
- (1) Note. The devices of this subclass are positioned between the slurry producing or conditioning means and the forming means, and may be in the nature of a large box to steady the flow of stock, or in the nature of a spreading nozzle only directing the slurry on the forming means. Included also are subcombinations of flow arrangements into the flow box to produce particular effects on the slurry.
- (2) Note. The devices of this subclass deliver the stock onto a traveling endless mold, usually either an endless flexible belt or a foraminous cylinder.
- (3) Note. The subject matter of this group deals with the problem of transforming the relatively small cross-section output of a feed pump into a wide flat stream directed against the moving endless mold surface and the subject matter includes within its confines all structure necessary for so shaping the flowing fluid slurry stream. The devices of this and the indented subclasses are known in the art as flow box, head box, slice, inlet, approach flow devices.
- 337** This subclass is indented under subclass 336. Apparatus provided with means (1) directing at least a portion of the stock slurry that is surplus back to the forming area, (2) means for removing from the forming area a layer of the pulp slurry, or (3) means removing surplus slurry or waste from the forming area before contact of the surplus material with the forming surface.
- (1) Note. "Surplus" or "excess" stock does not mean the white water drained through the forming wire. Rather it is stock over and above that which is necessary to form the product. For means removing white water search subclasses 335 and 348.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
335, and 348, and see (1) Note above.
- 338** This subclass is indented under subclass 336. Apparatus in which the means directing the slurry onto the molding surface has at least two inflow passages for the slurry, which passages enter on opposite sides of the directing means and the direction of flow of slurry through the means is toward each other.
- 339** This subclass is indented under subclass 336. Apparatus in which the container or head box for the stock supply directing the stock onto the forming surface is sealed against atmospheric pressure or contact of atmosphere with the slurry supply.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
317, for devices in which a confined stock stream is directed onto the forming surface and in which the confining means is in sealing contact with the foraminous forming surface.
- 340** This subclass is indented under subclass 339. Apparatus in which a gas under pressure higher than atmospheric pressure is maintained over the slurry supply within the head box usually to the velocity of the issuing slurry supply.
- 341** This subclass is indented under subclass 336. Apparatus having a solid body in contact with the pulp slurry which body is mounted for motion, the motion of the body some way influencing the characteristics of the stock.
- (1) Note. The moving body may be separate from the flow box and immersed in the slurry, or it may be a vibrating wall of the flow box itself.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 216, for processes including a step of mechanically treating the slurry in the head box or approach flow passage.
- 342** This subclass is indented under subclass 341. Apparatus in which the moving body is a rotating cylinder, immersed at least in part in the slurry.
- (1) Note. The rolls of this subclass are frequently called "rectifier" rolls and are usually perforated.
- 343** This subclass is indented under subclass 336. Apparatus (1) having means that are perforated or provide separate passageways for the slurry.
- (1) Note. The means may be a separate member immersed in the slurry stream so as to cause the stream to be divided. Examples of this type of device are immersed perforated screens, rake like members, or honeycomb structures. The means may also be separating passageways or conduits for the slurry which are not immersed but rather comprise the conducting system for the slurry.
- (2) Note. The dividing means do not permanently divide the stock stream so that separate streams are applied to the mold surface, rather they are inserted in the slurry stream and permit the stream to recombine so that the unitary sheet of slurry is applied to the mold.
- (3) Note. In this subclass may also be found, for example, head boxes in which a plurality of vaned members are inserted in the stock stream to reduce the cross-section of the stream confining means to thereby increase the velocity of the stream. Also in this subclass the vanes may, for example, have the function of quieting turbulence in the stream.
- 344** This subclass is indented under subclass 336. Apparatus having means to doctor or limit the thickness of the stock stream at the point of issuance from the supply container onto the foraminous forming surface.
- 345** This subclass is indented under subclass 344. Apparatus having more than a single stock thickness regulating means which means are separated one from the other and disposed in separated relationship in the direction of stock travel whereby the pulp slurry contacts the regulating means in sequence.
- 346** This subclass is indented under subclass 344. Apparatus in which means are provided for regulating at will the side-to-side span of the issuing slurry stream.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 366, for adjustable width suction boxes.
- 347** This subclass is indented under subclass 344. Apparatus in which the spacing between the effective edge of the slice member and its opposed passage defining element is varied by either bodily distorting the adjacent portions of the slice member, or causing the slice member to swing about on an axis of pivot.
- 348** This subclass is indented under subclass 289. Apparatus in which the forming surface comprises a pervious distortable looped web, traveling longitudinally of itself.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 315+, for combinations of an endless web mold and means directing stock into contact with the molding surface, and especially subclasses 318+ for cylinder molds with an endless mold trained around the cylinder.
 323+, for immersion vat type molding devices, most of which utilize a cylindrical mold.
- SEE OR SEARCH CLASS:
 210, Liquid Purification or Separation, subclasses 400+ for belt type filters.
 245, Wire Fabrics and Structure, appropriate subclasses, and especially subclass 8 for mesh belts, per se, made of woven wire and see the notes to the class definition of that class (245) for the locus of other wire fabric structures.

- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a stock material product in the form of a single or plural layer web or sheet, and especially subclasses 304.4+ for a composite web or sheet in which one component is porous or cellular.
- 474, Endless Belt Power Transmission Systems or Components, particularly subclasses 237+ for a friction drive belt.
- 349** This subclass is indented under subclass 348. Apparatus in which the flexible endless band is supported during at least a portion of its travel by a concomitantly traveling foraminous or pervious flexible member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
318+, for pervious cylinder molds with an endless pervious forming belt thereabout.
- 350** This subclass is indented under subclass 348. Apparatus provided with means to adjust or alter at will the general disposition of the foraminous forming surface relative to the horizontal.
- 351** This subclass is indented under subclass 348. Apparatus provided with means for regulating the quantity of fluid material passing through the foraminous forming surface.
- (1) Note. Any structure which bears against the bottom of the wire will in some way effect the drainage of the water through the wire, as for example, the table roll structures aid in removing water from the bottom of the wire, however for the purpose of this classification a specific disclosure of the influence on the drainage must be recited for classification in this subclass. For details of table structure or wire supporting structure in which such disclosures are not present search must be made in subclasses 354+ below.
- (2) Note. The devices of this subclass are positioned on the side of the wire away from the molding surface as distinguished from a mask or apron that is positioned on the molding surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
297, for pneumatic pressure or vacuum means acting directly on stock on mold surface.
353, for devices controlling the area of contact of the pulp with the mold surface and see (2) Note above.
363, for suction devices, per se.
- 352** This subclass is indented under subclass 351. Apparatus in which a solid member bears against the bottom surface of the flexible endless band for doctoring fluid material passing through the band.
- 353** This subclass is indented under subclass 348. Apparatus provided with means to restrict or alter the area of contact of the pulp slurry with the forming surface.
- (1) Note. The apparatus of this subclass control the application of slurry to the mold surface and are associated with the pulp carrying side of the mold as distinguished from devices under the mold and controlling the flow of white water or filtering medium after separation from the retained pulp. For the latter type of device see subclass 351 above.
- (2) Note. The devices of this subclass include, for example, the following: deckled straps, which are endless bands traveling with the mold and serving to form the side dams for the molding surface; apron devices which usually comprise a flexible cloth attached to the head box or stock supply means and extending over the endless belt to help carry the stock onto the endless belt.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
334, for cylinder molds having associated therewith mask deckle or apron structure.
351, for flexible endless band mold devices provided with means placed below the mold surface for collecting or control-

ling the flow of white water through the mold and see (1) Note above.

354 This subclass is indented under subclass 348. Apparatus having means relating to the support and mounting of the flexible endless band.

- (1) Note. In this subclass may be found, for example, table roll assemblies, breast roll mountings, cantilever frame structures, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 273, for endless belt mold table structures specifically adapted to permit changing and/or tensioning of the mold.
332, for mounting means for cylinder molds.

355 This subclass is indented under subclass 354. Apparatus provided with means imparting a shaking or reciprocating motion to the flexible endless band which motion is transverse to the general longitudinal motion of the band.

- (1) Note. The motion is usually for the purpose of causing better felting of the slurry during dewatering and forming on the mold.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 209, for processes for forming by felting and/or dewatering including the step of vibrating or agitating the slurry on the mold surface.
311, and 313+, for means separate from the mold for treating the stock on the molding surface.

356 This subclass is indented under subclass 355. Apparatus in which the direction of motion is at right angles to the direction of extension of the molding surface.

357 This subclass is indented under subclass 289. Apparatus relating to the structure of a rotary foraminous mold member which member is circular in a plane transverse to the axis of rotation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 323, for cylinder molds in combination with immersion vats, which vat contains the slurry.

SEE OR SEARCH CLASS:

- 492, Roll or Roller, subclasses 30+ for a roll, per se, not elsewhere provided for, having surface projections, indentations or slits. A roll of Class 492 is a material working roll rather than a forming or molding roll as provided for in this class (162).

358.1 Press and felt:

This subclass is indented under subclass 289. Apparatus comprising a means for subjecting wet formed paper web carried on a flexible permeable belt to solid pressure applying surfaces (e.g., roll pair, etc.).

- (1) Note. In this subclass, the pressing applying surface is usually a roll couple and the felt is generally for the purpose of carrying, pressing and dewatering the fragile wet paper web or interfacing between the paper web and the pressing means. Roll couples, per se, for treating webs either wet or dry when not in combination with a felt for the web may be found in the appropriate subclasses of Class 100, presses. However, if the sole purpose of the roll couple is disclosed to be for operation with a felt for Class 162 purposes, a mandatory cross is also made in this subclass.

358.2 With felt structure or felt composition:

This subclass is indented under subclass 358.1. Apparatus wherein a porous felt lying between a roll and the wet paper web for conveying and pressing the wet paper web has significant felt structure (e.g., groove, shape, dimension, etc.) or identified felt composition.

SEE OR SEARCH CLASS:

- 139, Textiles: Weaving, particularly subclass 383, for woven fabric, per se.
428, Stock Material or Miscellaneous Articles, appropriate subclasses for non-woven fabric having structure.

358.3 Extended nip press:

This subclass is indented under subclass 358.1. Apparatus wherein the pressure applying surfaces include conforming opposing press means (e.g., roll opposing overlapping stationary shoe having an impermeable belt structure moving between the shoe and wet paper web, etc.) which increases the area of the nip sandwiching a continuously moving wet formed paper for dewatering thereof.

- (1) Note. Thus, the nip that would normally be a single line contact point between two rolls is said to be an extended nip due to the greater pressing area of the conforming overlapping opposing press means.

358.4 With impermeable belt structure or impermeable belt composition:

This subclass is indented under subclass 358.3. Apparatus wherein an impermeable belt for conveying and contacting the wet web riding over the opposing conforming press means has significant belt structure (e.g., groove, shape, dimensions, etc.) or identified belt composition.

- (1) Note. The impermeable belt riding over the overlapping opposing press means is not to be confused with the permeable felt that lies between the roll and the wet paper web.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, particularly subclasses 844.1+, for conveyor belts, per se.
428, Stock Material or Miscellaneous Articles, appropriate subclasses for belts with structure.

358.5 With heating means:

This subclass is indented under subclass 358.3. Apparatus having separate means at the location of the extended nip press for directly or indirectly heating the wet paper web during an extended nip pressing operation.

359.1 With separate heated drying means:

This subclass is indented under subclass 358.1. Apparatus having, in addition to the solid pressure applying surfaces, a separate means for heating to dehydrate the wet-formed paper.

360.2 Plural sequential presses:

This subclass is indented under subclass 358.1. Apparatus in which the pressure applying surfaces are in spaced serially arranged relationship providing plural pressing locations.

360.3 Having three or more coacting rolls (e.g., compact press, etc.):

This subclass is indented under subclass 360.2. Apparatus having three or more coacting rolls wherein at least one of the rolls is simultaneously in contact with at least two other rolls to form plural press surfaces for simultaneously pressing a wet paper web moving therethrough.

- 361** This subclass is indented under subclass 289. Apparatus in which a solid member directly contacts a formed web of felted fibers and directly alters or modifies the structure of the web in some way.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 280+, for apparatus of the web creping or crinkling type and see also subclass 282 for devices which additionally corrugate the crinkled web.

- 362** This subclass is indented under subclass 361. Apparatus in which the solid member is irregular in surface configuration or imparts different characteristics to adjacent areas of the web.

- (1) Note. Included in this subclass are devices, per se, for treating a felted web whether the web is dry, still damp from the water laying process, or rewetted to facilitate working.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 109, for processes for forming a nonuniform, irregular or configured web.
309, for apparatus in which an irregular treating member acts on the web on the forming means.

- SEE OR SEARCH CLASS:
 29, Metal Working subclasses 90.01+ and especially subclasses 90.1+ for bur-
 nishing of paper.
 101, Printing, subclasses 3.1+ for appara-
 tus for embossing dry paper webs.
- 363** This subclass is indented under subclass 289. Apparatus provided with means operating on the web at a reduced pressure relative to atmospheric pressure for the purpose of dewatering the moist slurry web.
- (1) Note. The devices of this and the indented subclasses are not forming molds, or molds in combination with suction applying means, but are rather the suction means, per se, which may or may not be disclosed as acting through a forming mold. Thus, the devices may act on the moist web either on the forming mold, or after removal from the mold.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 252, for suction means having an auto-
 matic control feature.
 278, and 279, for apparatus conditioning
 devices including means to apply suc-
 tion to the apparatus being condi-
 tioned.
 297, for vacuum means acting directly on
 the stock on the mold surface.
 335, for cylinder molds combined with
 drain or suction means.
 351, for flexible endless band type molding
 devices having drainage control
 means for white water.
- SEE OR SEARCH CLASS:
 15, Brushing, Scrubbing, and General
 Cleaning, subclasses 300.1+ for
 cleaning machines of the suction type.
- 364** This subclass is indented under subclass 363. Apparatus in which more than a single discrete suction device are associated in treating a single workpiece or in which the source of suction and the conduits external of the suction applying means is claimed.
- 365** This subclass is indented under subclass 363. Apparatus in which the suction device has a to-and-fro motion.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 355, for devices in which an endless belt-
 type foraminous mold reciprocates
 transversely of the suction box.
- 366** This subclass is indented under subclass 363. Apparatus having means to alter at will the area of action of the device in a direction transverse of the length of the work piece.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 334, and 353, for molding devices in which
 a foraminous mold has masking
 means associated therewith.
- 367** This subclass is indented under subclass 363. Apparatus in which the suction device has a permeable work contacting surface through which the suction is drawn, which surface is mounted for motion.
- 368** This subclass is indented under subclass 367. Apparatus in which the moving suction device is a cylinder mounted for rotation about its axis and the permeable surface is the circumferential surface of the cylinder.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 357, for rotary pervious cylinder structures
 which are cylinder molds, that is,
 adapted to accrete a layer of pulp on
 the surface thereof.
- 369** This subclass is indented under subclass 368. Apparatus in which the active suction area of the pervious cylinder consists of a restricted portion of the circumference of the cylinder, the restriction being caused by a confined suction producing chamber bearing against the inner walls of the rotary pervious cylinder.
- 370** This subclass is indented under subclass 369. Apparatus in which plural discrete chambers or a single partitioned chamber bears against the inner peripheral wall of the cylinder whereby

more than a single suction area is applied to the inner wall.

371 This subclass is indented under subclass 369. Apparatus in which the internal suction box is provided with glands or packing means where it bears against the inner surface of the rotary cylinder.

372 This subclass is indented under subclass 368. Apparatus in which the invention relates to the structure or details of the rotary pervious cylinder, per se.

SEE OR SEARCH CLASS:

492, Roll or Roller, for a roll, per se, not elsewhere provided for.

373 This subclass is indented under subclass 363. Apparatus in which the contact surface of the suction device comprises at least one solid impermeable cylindrical member mounted for rotation about its symmetrical axis.

(1) Note. In this subclass the suction is not through the rollers but between the rollers, the rollers being nonpervious. Subclasses 368+ provides for suction devices utilizing a pervious cylinder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

368+, and see (1) Note above.

374 This subclass is indented under subclass 363. Apparatus in which the product bears against and slides relative to the suction device and some detail of the bearing surface is recited.

375 This subclass is indented under subclass 232. Apparatus having means to modify the temperature of the work or any portion of the apparatus.

(1) Note. Included in this subclass are molding devices combined with separate heated drying means, ovens, etc., for drying the molded product and also heat exchange means directly associated with the molding device for heating the device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

121, for processes of winding or roll forming utilizing heat.

192, for processes utilizing electrical or wave energy, which energy may generate heat in the product.

207, for processes producing or treating running length work involving a heating step.

224, and 226, for processes involving a step of heating discrete articles.

290, for the combination of means producing and endless web and separate heat exchange means.

359, for press and felt devices with separate heated drying means.

SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses for drying means, per se, and see the class definition of that class (34) for the locus of other heating and/or drying devices.

376 This subclass is indented under subclass 375. Apparatus having means to increase the temperature of a pervious felting mold for forming the work.

377 This subclass is indented under subclass 375. Apparatus having a solid heated shaping member which contacts the work.

378 This subclass is indented under subclass 377. Apparatus in which the heated shaping member is brought into heat exchange relationship with the felted article while it is still on the felting form.

379 This subclass is indented under subclass 378. Apparatus in which more than a single heated die is contacted serially with the work piece.

380 This subclass is indented under subclass 232. Apparatus including means to prepare the stock material for the forming step or to maintain or continue the proper condition of the stock material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 1+, for various processes for preparing pulp which include a step of chemical liberation, recovery or purification of fibrous material and subclasses 233+, for corresponding apparatus.
- 158+, for processes involving a step of adding a nonfibrous material to the pulp.
- 187, for pulp preparation processes including a step of hydration or gelatinization.
- 189, for processes involving a step reclamation salvage or reuse of materials.
- 261, for paper making apparatus combined with beating, refining and/or disintegrating means.
- 263, for apparatus having measuring or testing means.
- 264, for apparatus for the recirculation or treatment of white water or broke.

SEE OR SEARCH CLASS:

- 137, Fluid Handling, appropriate subclasses for devices, per se, controlling the consistency of the slurry stock and especially subclass 92 and 467.5.

381 This subclass is indented under subclass 232. Apparatus combined with means, per se, classifiable in another class.

- (1) Note. Search must be made in various subclasses above in the schedule for those combinations specifically set out therein.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 201, for combined processes.

382 This subclass is indented under subclass 232. Apparatus having a pervious die for accreting a fibrous article from a suspension of fibers in a liquid by draining surplus liquid through the pores of the die.

- (1) Note. The devices for this and the indented subclass produce discrete articles as distinguished from the devices of subclass 289 in which endless, running, or indefinite length article is produced.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 218+, for discrete article forming processes.
- 289+, and see (1) Note above.

383 This subclass is indented under subclass 382. Apparatus in which the foraminous die has separate areas adapted to pass therethrough different amounts of suspending fluid.

- (1) Note. In this subclass may be found for example, apparatus in which a portion of the foraminous die is masked off to prevent accretion of pulp in those areas or to vary the thickness of the deposited layer of pulp. Also in this subclass may be found apparatus in which different degrees of suction are applied to various areas of the mold to increase or decrease selectively the amount of deposition of pulp on the mold surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 109+, for processes producing a nonuniform, irregular or configured sheet or web.
- 334, and 353, for apparatus for producing an endless web and having masking means.

384 This subclass is indented under subclass 382. Apparatus in which the water or liquid carrying the fiber is caused to be expressed through the foraminous forming mold at least in part by the action of centrifugal force.

SEE OR SEARCH CLASS:

- 164, Metal Founding, subclasses 286+ for centrifugal metal casting apparatus.
- 210, Liquid Purification or Separation, subclasses 360+ for apparatus having a filter medium adapted for rapid movement about an axis of rotation and see the Notes thereto for the locus of other centrifugal devices.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 425+ for an apparatus including mold motion to distribute or compact stock therein.

- 385** This subclass is indented under subclass 382. Apparatus in which the bulk supply of slurry is brought into contact with the forming means by bodily moving the container for the bulk supply into association with the foraminous forming surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
388, for means for causing this association in which the mold moves into the slurry supply while the supply remains stationary.
- 386** This subclass is indented under subclass 382. Apparatus having means to grasp the foraminous forming mold for manipulation directly by the operator during the forming step.
- 387** This subclass is indented under subclass 382. Apparatus in which a foraminous forming surface is brought into contact with an excess of pulp slurry and that amount of fibers necessary to form the completed article are deposited on the mold by difference in pressure between the back surface of the foraminous mold and the supply of pulp, and the mold with the fiber layer thereon is then removed from the body of the pulp slurry.
- 388** This subclass is indented under subclass 387. Apparatus provided with means for bodily changing the position of the foraminous mold to bring it into and/or out of relationship with the bulk supply of pulp slurry.
- 389** This subclass is indented under subclass 388. Apparatus provided with concurrently moving means applying suction to the nonmolding side of the foraminous forming surface which means are separable from the mold or have a different motion therefrom.
- 390** This subclass is indented under subclass 388. Apparatus in which the means holding the pulp slurry is partitioned to provide separate areas of slurry and/or separate discrete pulp slurry holders are provided.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
219, for plural stage deposition processes.
- 391** This subclass is indented under subclass 388. Apparatus in which the means moving the mold is mounted for motion about an axis of rotation.
- 392** This subclass is indented under subclass 391. Apparatus having in addition to molding means a separate means for applying pressure to the felted article on the forming die or after removal from the forming die.
- 393** This subclass is indented under subclass 388. Apparatus having means mounting the foraminous mold for to and fro motion relative to the pulp supply.
- 394** This subclass is indented under subclass 393. Apparatus provided with means to apply pressure to the felted article either while still on the forming die or after removal therefrom.
- 395** This subclass is indented under subclass 388. Apparatus provided with means for applying pressure to the felted article either while still on the forming die or after removal from the forming die.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
305, for apparatus forming an indefinite length product combined with means to thereafter subject the product to pressure.
415, for compressors, per se.
- 396** This subclass is indented under subclass 382. Apparatus in which at least a portion of the liquid of the slurry fiber supply is expressed through the foraminous mold by a solid member moving toward the foraminous molding surface to increase the pressure of the slurry against the mold surface.
- (1) Note. In these devices the pressure differential between the two faces of the molding surface may be increased or supplemented during the molding step by applying a vacuum behind the mold face.
- (2) Note. The pressing surface opposed to the foraminous molding surface may itself be a foraminous molding surface.

- 397 This subclass is indented under subclass 396. Apparatus having more than a single molding set whereby plural discrete articles are produced.
- 398 This subclass is indented under subclass 397. Apparatus in which the opposed foraminous mold platen and opposed pressure surface are generally planar and quite extensive relative to the thickness of the article produced.
- 399 This subclass is indented under subclass 396. Apparatus in which the opposed foraminous mold platen and opposed pressure surface are generally planar and quite extensive relative to the thickness of the article produced.
- 400 This subclass is indented under subclass 399. Apparatus provided with means extending between the opposed molding surfaces whereby holes are formed in the article during the molding step.
- 401 This subclass is indented under subclass 396. Apparatus in which the pressure applying platen is an elastic member, which is distorted to apply pressure to the slurry on the mold.
- 402 This subclass is indented under subclass 401. Apparatus in which the pressure applying means surrounds the pulp body and a foraminous core.
- 403 This subclass is indented under subclass 396. Apparatus in which the mold surface generates a cylindrical cavity and pressure is exerted on the pulp slurry by causing the mold to contract thus reducing the cavity in volume.
- 404 This subclass is indented under subclass 403. Apparatus in which a hollow foraminous member is positioned within the mold and through which liquid is expressed during the pressure applying step.
- 405 This subclass is indented under subclass 396. Apparatus in which a core member is adapted to be changed in dimension in normal operation.
- (1) Note. The core may be expanded to exert pressure on the slurry material, or it may be contracted for ease of removal from the mold.
- SEE OR SEARCH CLASS:
249, Static Molds, subclasses 178+ for static cores having means to expand or contract the core.
- 406 This subclass is indented under subclass 396. Apparatus having a mold member which forms a hole or cavity in the pulp product which member is foraminous so that the suspending fluid may be drained therethrough.
- 407 This subclass is indented under subclass 382. Apparatus having means for filling a mold cavity with the liquid pulp slurry.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
387, for apparatus for moving a mold into a slurry supply.
- 408 This subclass is indented under subclass 407. Apparatus in which the means for filling the mold form a closed passageway interconnected with the hollow mold and further means are provided for increasing the pressure of the slurry within the mold.
- SEE OR SEARCH CLASS:
164, Metal Founding, subclasses 303+ for metal injecting apparatus.
- 409 This subclass is indented under subclass 407. Apparatus in which separate charges are applied to distinct areas within this mold.
- 410 This subclass is indented under subclass 382. Apparatus provided with means for bodily removing the formed product from the forming mold.
- (1) Note. To be classified in this subclass means must be present for positively displacing the article from the mold or mold cavity.
- SEE OR SEARCH CLASS:
164, Metal Founding, subclasses 344+, for metal casting devices including product ejecting means.

- 249, Static Molds, subclass 66.1 for mold having means to apply a force to remove or release the product.
- 411** This subclass is indented under subclass 382. Apparatus comprising a dipping mold.

SEE OR SEARCH CLASS:

- 118, Coating Apparatus, subclasses 400+ for an immersion type coating apparatus.
- 249, Static Molds, appropriate subclasses, for mold having a movable or removable foraminous liner and subclass 141 for a foraminous mold, per se.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 269+ for apparatus comprising a dipping type shaping form with disclosed product removal.
- 415** This subclass is indented under subclass 232. Apparatus having solid means for compacting a felted water-laid fibrous article.

- (1) Note. The devices of this subclass operate on the fibrous body while still moist. The shaping or compressing of dry paper is provided for in other classes, such as Class 100, Presses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 223, for processes for reshaping a fibrous article.
- 224+, for processes for subjecting a fibrous article to heat and/or mechanical pressure.
- 305, for apparatus forming a running length product combined with separate pressing means.
- 358+, for press and felt devices.
- 361+, for solid means acting on a formed web.

SEE OR SEARCH CLASS:

- 100, Presses, appropriate subclasses for presses, per se, where no shaping is involved.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 395+ for die shaping a sheet or web article.

- 416** This subclass is indented under subclass 415. Apparatus in which the surface of the compressor contacting the work is contoured or is other than flat.

CROSS-REFERENCE ART COLLECTIONS

900 PAPERMAKING PRESS FELTS:

Cross-reference art collection of porous felts, per se, which are utilized to carry, press and dewater a wet paper web and which felts are defined by structure or composition.

- (1) Note. The felt usually rides between a roll and the wet paper web. It is not to be confused with the foraminous wet paper forming means (e.g., wire) on which the paper is formed from paper pulp or with the impermeable belt utilized to convey and press the wet paper web or with the drier section fabrics which generally have higher permeability.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 358.2, for press and felt combinations having significant felt structure or having felt composition.

SEE OR SEARCH CLASS:

- 139, Textiles: Weaving, particularly subclass 388, for woven fabric, per se.
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for non-woven fabric having structure.

901 IMPERMEABLE BELTS FOR EXTENDED NIP PRESS:

Cross-reference art collection of impermeable belts, per se, defined by structure or composition and utilized as a wet paper web contacting, pressing or carrying means that rides over the opposing conforming press means (e.g., shoe or shoes, etc.) to form with a cooperating roll the extended nip for pressing the wet paper web.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 358.4, a press with felt that is utilized as an extended nip press and has an impermeable belt with structure or composition in combination therewith.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, particularly subclasses 844.1+, for conveyor belts, per se.
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for belts with structure.

SEE OR SEARCH CLASS:

- 139, Textiles: Weaving, particularly subclass 383, for woven fabrics having seam structure.

END

902 WOVEN FABRIC FOR PAPERMAKING DRIER SECTION:

Cross-reference art collection of woven fabrics for supporting or conveying wet paper web through the drying section of the papermaking system, not to be confused with felts utilized in the pressing section or members utilized in the paper forming section.

SEE OR SEARCH CLASS:

- 34, Drying and Gas or Vapor Contact With Solids, particularly subclass 243, for drier fabrics.
- 139, Textiles: Weaving, particularly subclass 383, for woven fabric, per se.

903 PAPER FORMING MEMBER (E.G., FOURDRINIER, SHEET FORMING MEMBER, ETC.):

Cross-reference art collection of foraminous papermaking members, per se, onto which a wet paper web is formed from a slurry of fibrous pulp with or without other wet end paper additives.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 348+, for papermaking apparatus having as an element thereof a flexible endless band forming member (e.g., Fourdrinier, etc.).

SEE OR SEARCH CLASS:

- 139, Textiles: Weaving, particularly subclass 425, for from woven fabric.

904 WITH SPECIFIED SEAM STRUCTURE OF PAPERMAKING BELT:

Cross-reference art collection wherein structural details of the seam which joins two ends of papermaking fabric to produce an endless belt are recited.